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Seattle Dept. of Water, WA

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Cincinnati, OH

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Seattle Tolt Water Supply Mixed Asbestiform Removal Study

Appendices B and C

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16. ABSTRACT

For 1 1/2 years the Seattle Water Department conducted direct filtration pilot plant studies at the Tolt Reservoir, obtaining data on techniques to remove amphibole and chrysotile asbestos from drinking water. Research showed that filtered water turbidity should be 0.1 ntu or lower in order to effectively remove fibers. Flocculation was necessary but sedimentation was not. Amphibole fibers are more readily removed than chrysotile, but both types could be reduced to below detectable limits or to not statistically significant counts by treatment with alum, lime and a filter aid (nonionic or anionic polymer); or alum, cationic polymer and a filter aid; or cationic polymer and a filter aid. Asbestos fiber content of filtered water increased sharply when filtered water turbidity rose above 0.10 ntu. Asbestos fibers in the concentrations encountered in this study (raw up to 20×10^6 f/L, filtered down to 0.01×10^6 f/L) can not be detected by a turbidimeter; however, the association of rising fiber counts and turbidities in filtered water would enable a plant operator to estimate fiber removal by observing turbidity if the filter was operated in the manner done in this work. Appendix B contains equipment photographs; data on operating conditions, water quality, fiber counting, and filter media; turbid water test data; results of sludge studies; and documentation of cost estimation data. Appendix C has details on conditions for each filter run.

17. KEY WORDS AND DOCUMENT ANALYSIS

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SEATTLE TOLT WATER SUPPLY
MIXED ASBESTIFORM REMOVAL STUDY

Appendices B and C

by

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Grant No. 804422

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CINCINNATI, OHIO 45268

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FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies, and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

This report presents the results obtained and conclusions drawn from pilot plant filtration research on the removal of naturally occurring asbestiform fibers from a protected mountain water source. Appendix B contains photographs of equipment; data on operating conditions, water quality, fiber counting, and filter media; information on treatment of turbid water; results of sludge generation studies; and detailed documentation of cost estimating information. Appendix C presents information on environmental conditions of each filter run.

Francis T. Mayo, Director
Municipal Environmental Research
Laboratory

ABSTRACT

Pilot plant research conducted during 1977 and 1978 demonstrated that both amphibole and chrysotile asbestos can be removed using direct filtration techniques at filter loading rates as high as 10 gpm/ft^2. Since asbestos fibers, especially chrysotile, were found to be quite sensitive to changes in the treatment process, vigilant control over chemical additions and finished water turbidity is a necessity. During the study, engineering data were also obtained for making cost estimates for construction and operation of a 100 MGD granular media filtration plant.

Photographs of pilot plant apparatus are contained in Appendix B-1. It includes pictures of the existing facilities on the Tolt, the Waterboy pilot plant and piping, mixers, storage tanks and sludge settling basins. Weather and operating conditions at the South Fork Tolt Reservoir are presented in Appendix B-2. It contains water and air temperatures, valve operations and flow conditions. Appendix B-3 includes information from the manufacturers on granular media filters and various graphs of water production efficiencies.

Both amphibole and chrysotile asbestos fibers are in the micron size range and require that electron microscopy techniques be used for counting. Appendix B-4 contains micrographs of these fibers. Appendix B-5 contains information on particle counts and turbidity from various filter runs.

To determine the capabilities of direct filtration treatment techniques at treating water with abnormally high raw water turbidities, tests were conducted on water with a turbidity as high as 34 NTU. The treatment techniques could consistently remove turbidity from 20 NTU down to $\leq$ 0.5 NTU. Appendix B-6 contains a description of these pilot tests.

Water pollution laws now require treatment of wastes generated at water filtration facilities. Pilot settling tests were conducted on sludge generated from backwashing the Waterboy granular media filter. The tests indicate that a sludge with a concentration of 2-3% can be produced by gravity settling. Appendix B-7 contains details of the settling tests.

Based on design criteria developed during the filtration studies, CH2M/Hill Consulting Engineers developed treatment plant costs. Construction costs were estimated at $24,747,000 and annual operation and maintenance costs were $1,212,000. Appendix B-8 contains details on the development of the costs.

To document the conditions surrounding each pilot filter run, Appendix C contains a description of the treatment trains, mixing intensities, physical and chemical properties of the water and data on water production efficiencies.

This report was submitted in fulfillment of Grant No. 804422 by the Seattle Water Department under the sponsorship of the U.S. Environmental Protection Agency. This report covers a period from May, 1976 to November, 1978 and work was completed March, 1979.

CONTENTS

Appendix		Page
B-1	Photographs of Pilot Plant Apparatus	1
B-2	Weather and Operating Conditions at the South Fork Tolt Reservoir and Tolt Regulating Basin.	22
B-3	Summary of Information on Granular Media Filters	44
B-4	Micrographs of Asbestos Fibers	57
B-5	Particle Count Data.	64
B-6	Filter Run Pilot Testing at High Raw Water Turbidities . . .	70
B-7	Sludge Settleability Testing	95
B-8	Detailed Documentation of Cost Information	101
C-1	Tabulated Conditions Surrounding Each Filter Run	105
C-2	Diagrams of Flow Schematics Tested During the Pilot Study. .	150

APPENDIX B-1

PHOTOGRAPHS OF PILOT PLANT APPARATUS

Figure B1-1. Ring gate and intake tower on South Fork Tolt Reservoir.

Figure B1-2. Tolt Regulating Basin.

Figure B1-3. Screen house at Tolt Regulating Basin.

Figure B1-4. Tolt Regulating Building.

Note: Pilot plant located inside this structure.

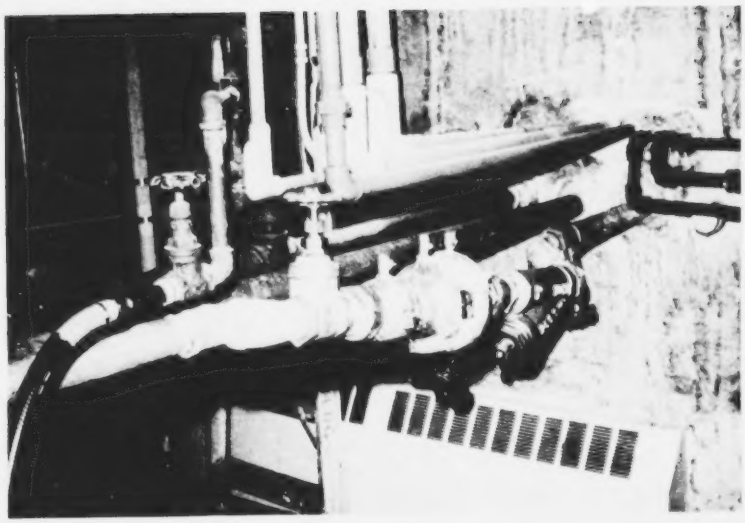

Figure B1-5. Backflow preventor on service to pilot plant.

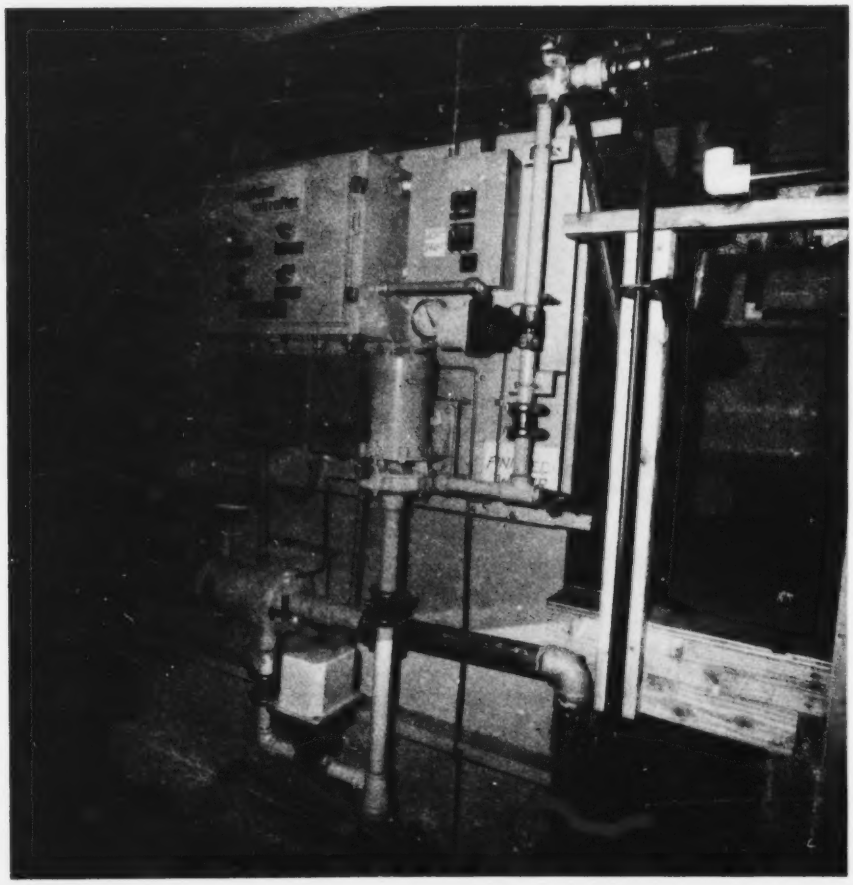

Figure B1-6. Front view of Neptune Microfloc Waterboy-27 pilot plant.

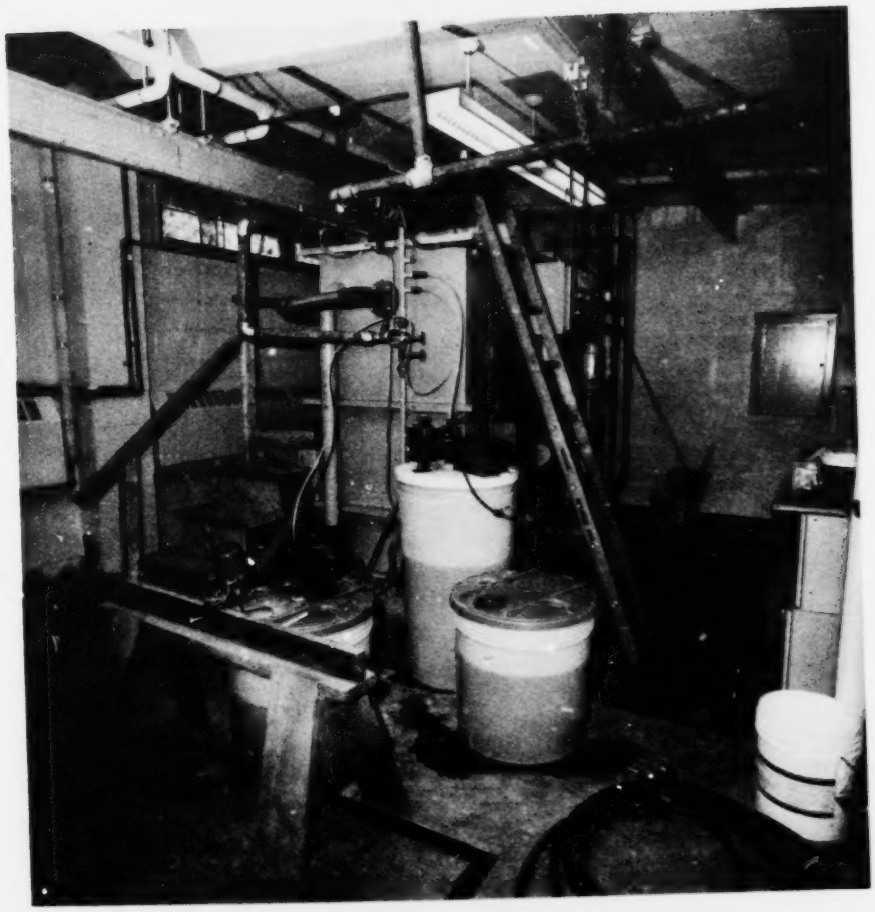

Figure B1-7. Pilot plant and chemical solution barrels.

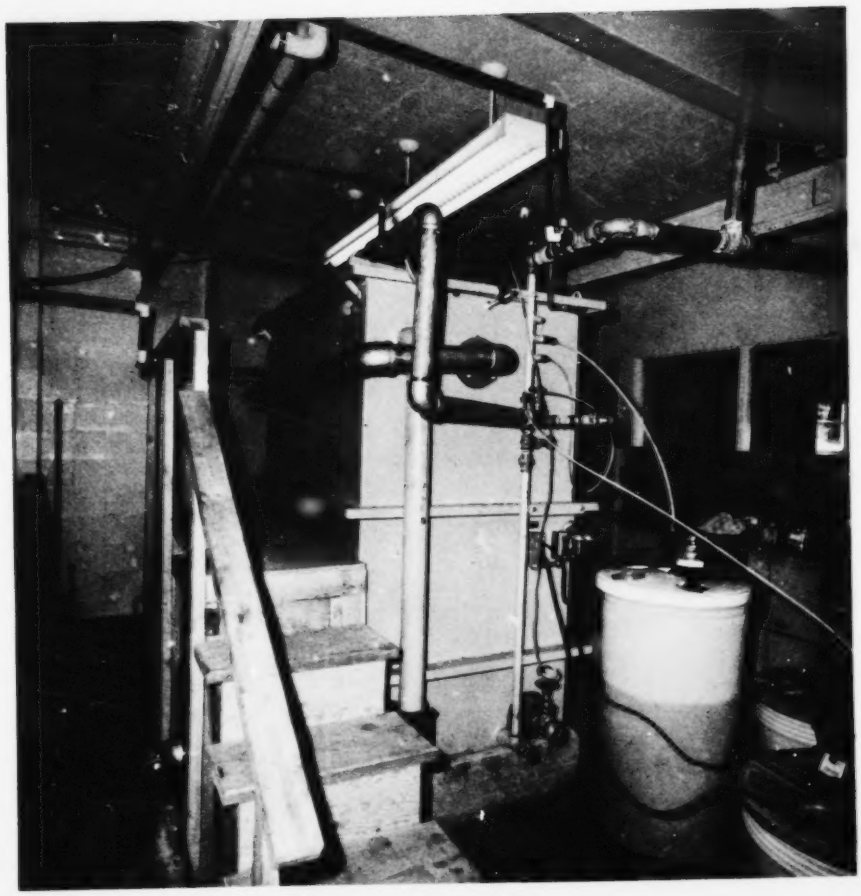

Figure B1-8. Pilot plant with platform and by-pass pipes.

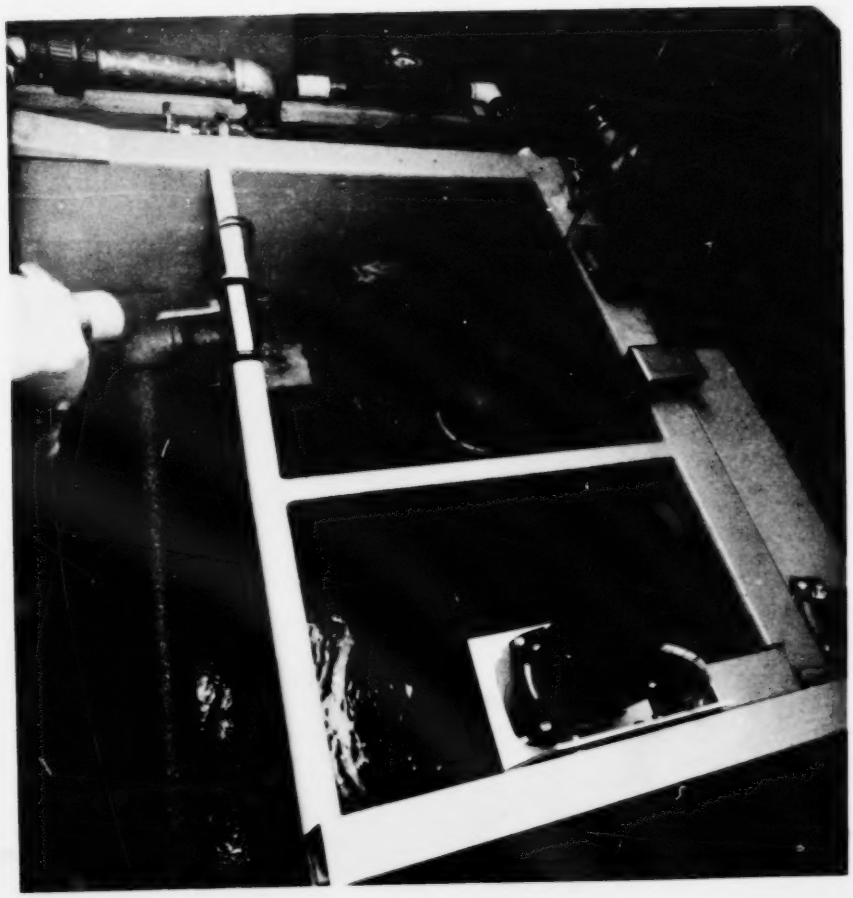

Figure B1-9. Top view of pilot plant.

Note: Settling chamber by-pass line.

Figure B1-10. Mechanical surface wash of filter media.

Note: Purpose of mechanical wash to release air prior to backwashing.

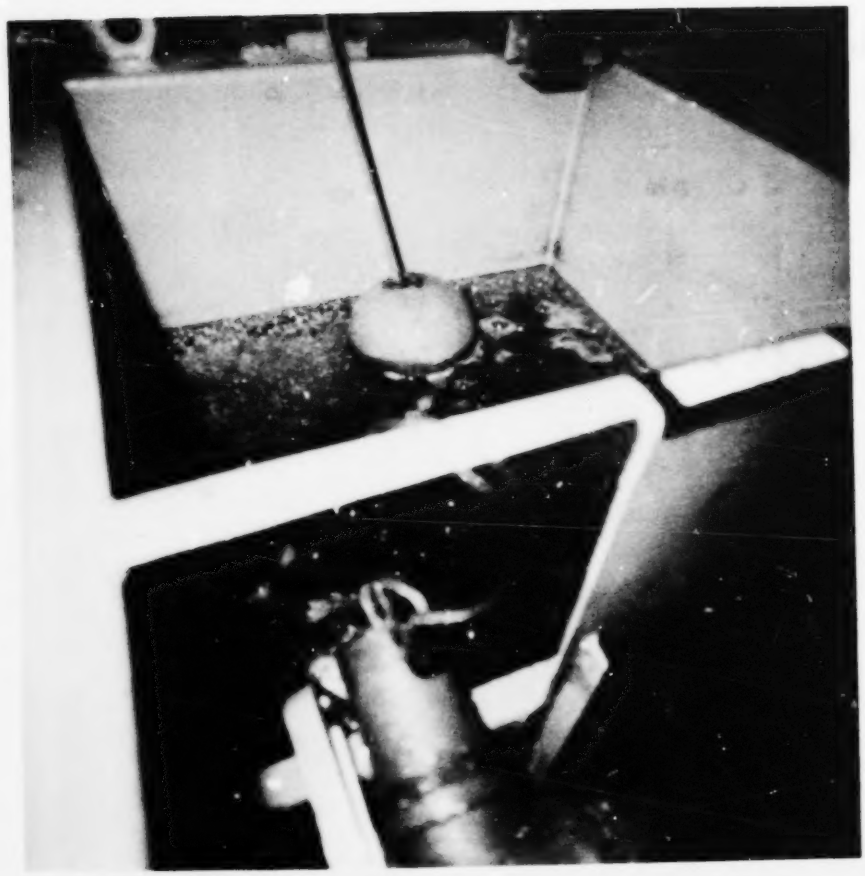

Figure B1-11. Top view of pilot filter.

Note: Air bubbles rising to surface.

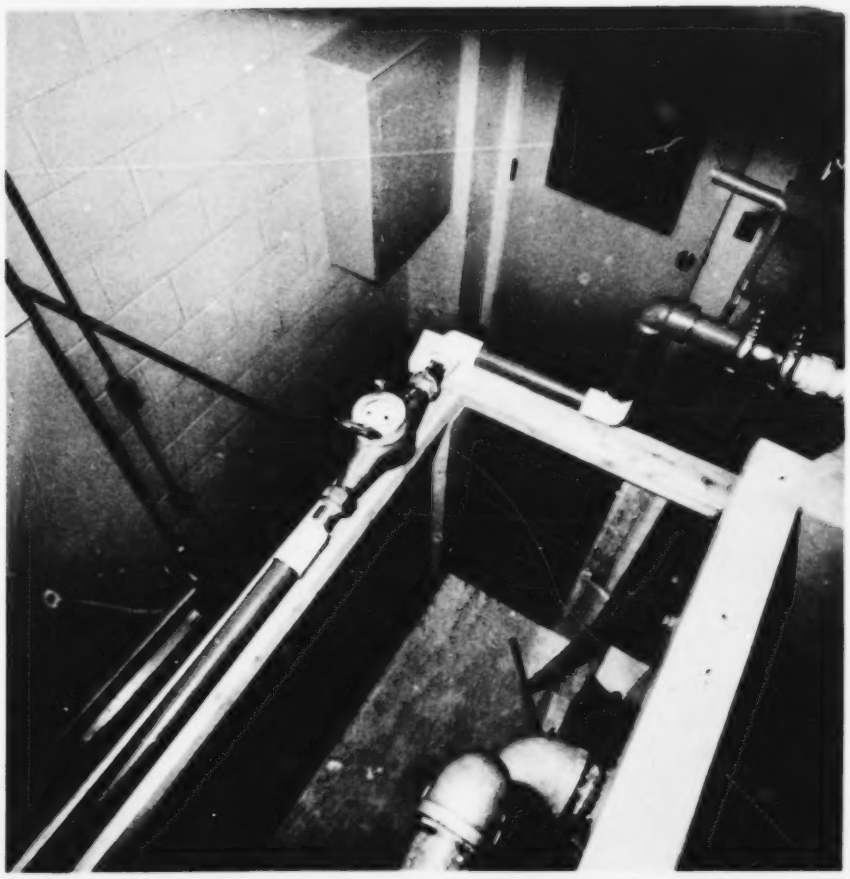

Figure B1-12. Meter on effluent from filter.

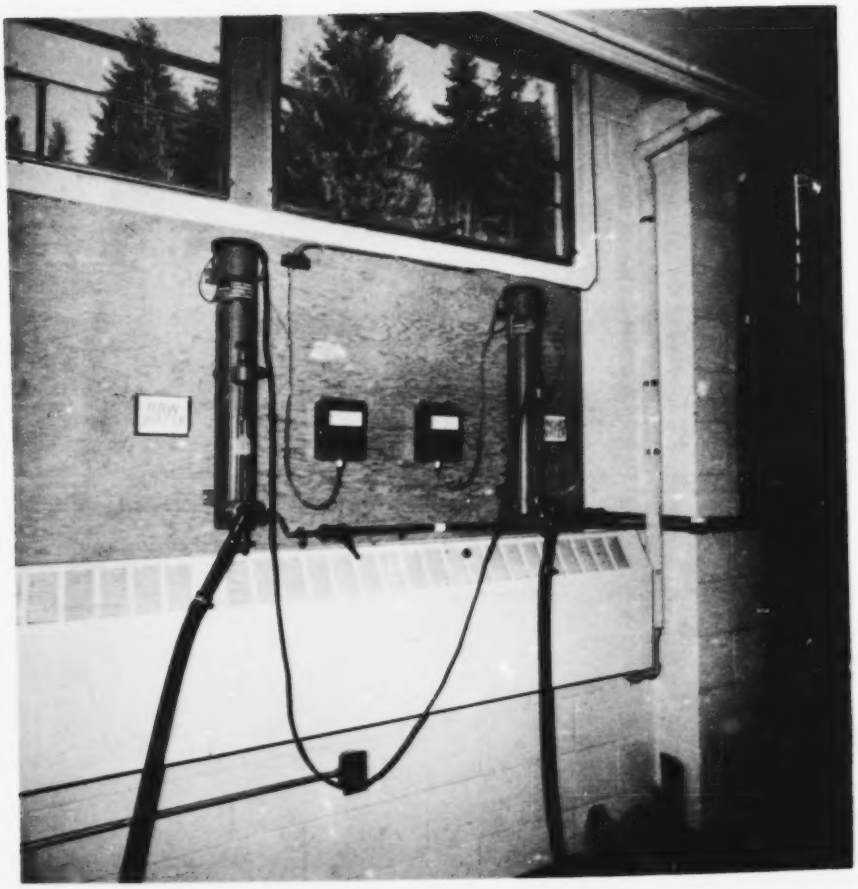

Figure B1-13. Continuous turbidimeters on raw and finished water.

Figure B1-14. Backwash water storage tank.

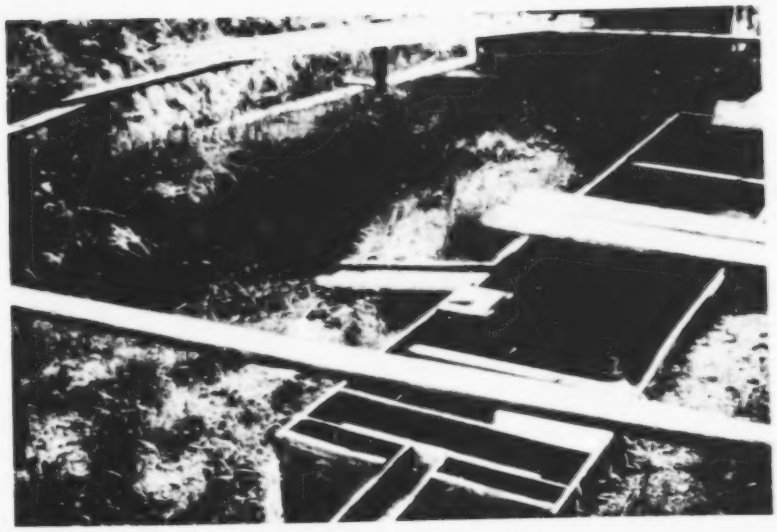

Figure B1-15. Plywood backwash wastewater settling basin.

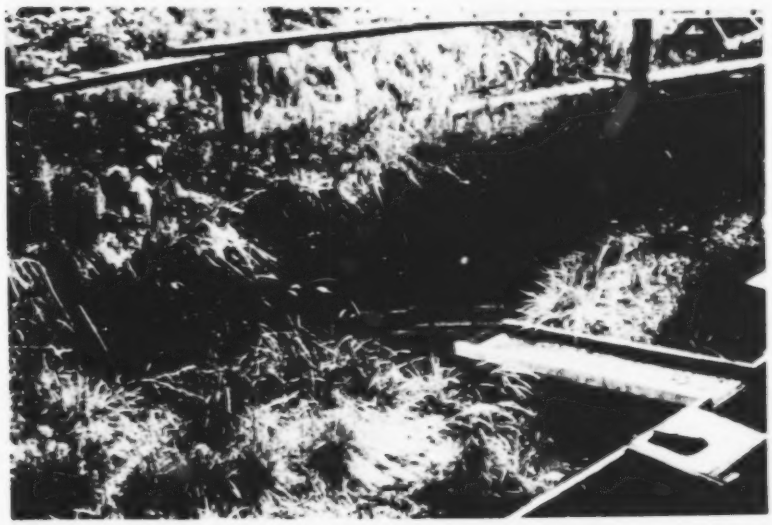

Figure B1-16. Earthen emergency overflow settling basin.

Figure B1-17. Top view of North Fork Tolt River from bridge.

Note: All plant wastes and surface drainage discharge to this receiving stream.

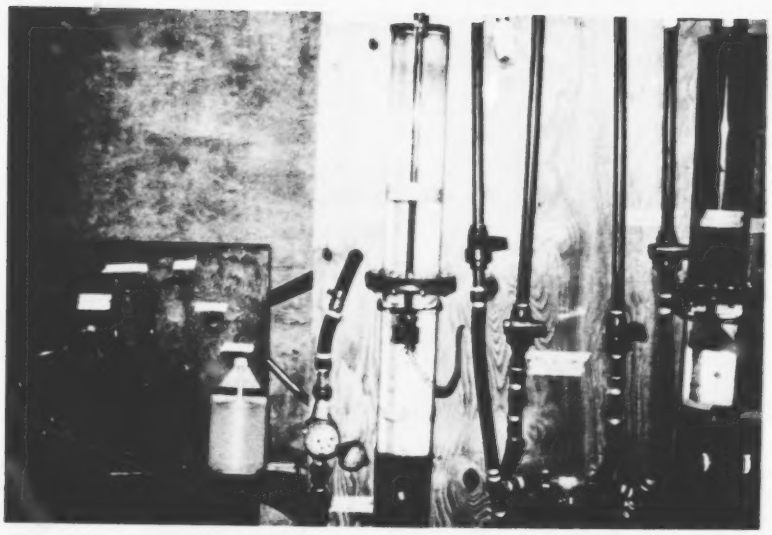

Figure B1-18. Pilot filter columns constructed by Seattle Water Department.

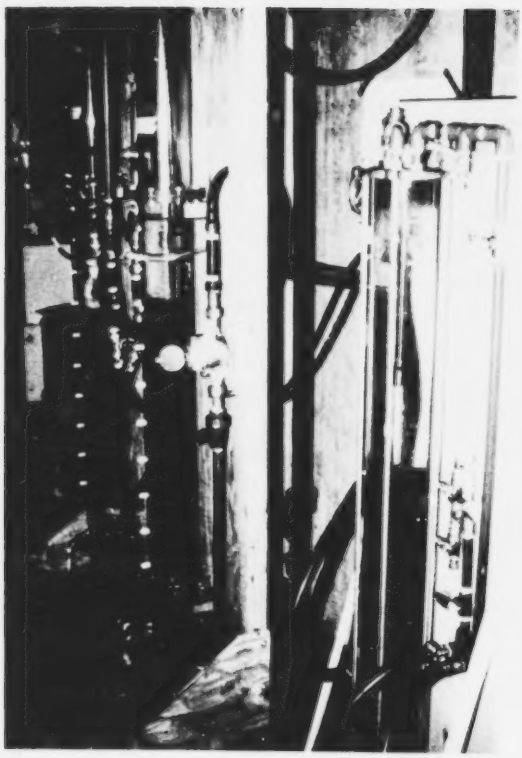

Figure B1-19. Pilot filter column purchased from Neptune Microfloc, Inc.

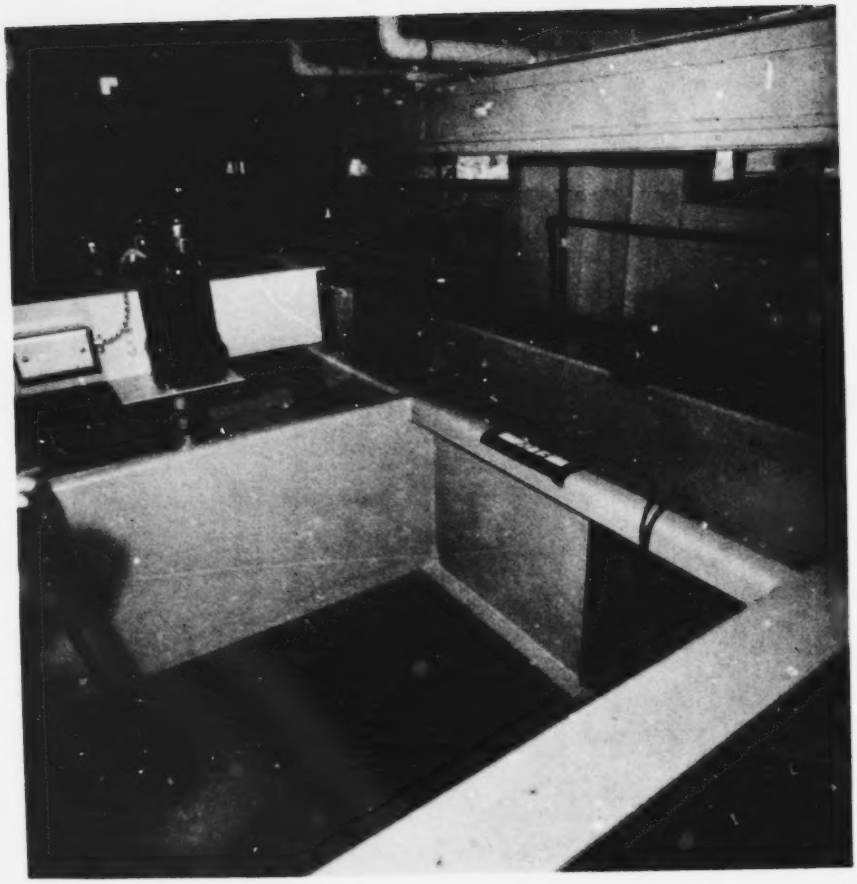

Figure B1-20. Static mixers on pilot plant.

Note: Mixers were loaned to Seattle Water Department by USEPA.

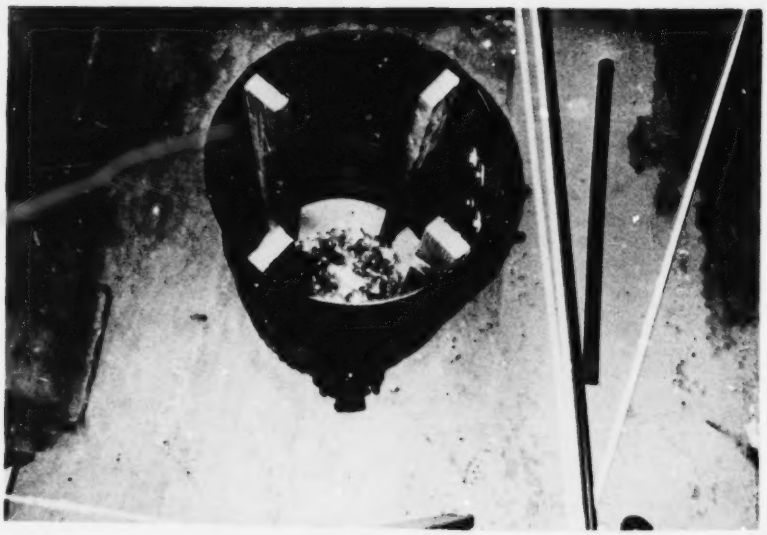

Figure B1-21. Mixing barrels.

Note: Baffles to prevent vortex.

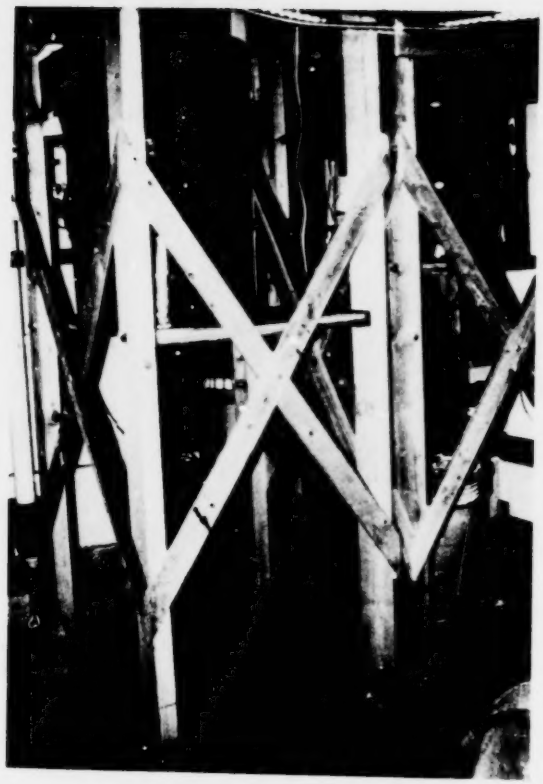

Figure B1-22. Adjustable platforms supporting mixing barrels.

APPENDIX B-2

WEATHER AND OPERATING CONDITIONS AT THE SOUTH FORK TOLT RESERVOIR AND TOLT REGULATING BASIN

APPENDIX B-2. WEATHER AND OPERATING CONDITIONS AT THE SOUTH FORK TOLT RESERVOIR AND TOLT REGULATING BASIN - MONTH OF JANUARY, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1751.35	18	NE	0	34.0	5.0	1.50	0	759.8	0	1.20	35	68
2	1751.25	36	NE	0.13	36.5	5.0	1.80	0	759.8	0.09	1.20	35	66
3	*1750.98	0	-	0.03	29.0	4.5	1.60	0	759.5	0.02	1.20	35	67
4	*1750.70	3	NE	0.02	27.0	4.5	1.30	0	759.1	0.02	1.10	35	71
5	*1750.42	3	NW	0	27.5	4.0	1.10	0	758.9	0	1.20	35	64
6	*1750.14	4	NE	0	27.5	3.5	1.40	0	760.1	0	1.10	35	50
7	1749.86	5	NE	0	22.5	3.5	1.50	0	760.4	0	1.10	35	55
8	1750.12	0	-	0	21.5	3.0	1.20	0	759.3	0	1.10	15	51
9	1750.18	5	SE	0	32.0	3.0	1.20	0	758.3	0	1.00	15	53
10	1750.11	3	SE	0	31.5	3.0	1.00	0	756.7	0	1.00	-	51
11	1749.83	10	NE	0.10	33.5	3.0	1.00	0	756.5	0.08	0.90	25	59
12	1749.75	8	SW	1.30	39.0	3.0	2.50	0	758.1	1.05	0.90	35	54
13	1749.82	8	NE	0.98	38.5	3.5	0.90	0	759.3	0.47	1.10	35	51
14	1749.83	6	NE	0.34	38.0	3.5	1.20	0	760.2	0.18	1.20	30	55
15	1749.81	0	-	0.18	39.5	3.5	1.20	0	760.4	0.13	1.20	30	48
16	1750.15	10	SE	0.40	40.5	4.0	1.10	0	760.2	0.21	1.20	15	52
17	1751.63	0	-	1.10	44.5	4.0	1.20	0	758.5	0.69	1.20	15	50
18	1753.55	20	NE	0.90	45.0	4.0	1.80	0	758.3	0.65	1.40	20	54
19	1755.14	20	SE	0.66	45.0	4.5	1.60	0	758.1	0.53	1.45	20	48
20	1755.45	34	NE	0	44.0	4.0	1.50	0	758.5	0	1.70	25	52
21	1755.48	0	-	0	44.5	4.0	1.50	0	757.4	0	1.20	25	65
22	1755.43	5	NE	0.10	35.5	4.0	1.30	0	758.7	0.05	1.40	75	66
23	1755.32	3	NW	0	38.5	4.0	1.30	0	760.0	0	1.40	75	68
24	1755.21	5	SE	0	39.5	4.0	1.20	0	759.6	0	1.20	30	67
25	1755.08	0	-	0	38.0	4.0	1.20	0	760.1	0	1.40	30	63
26	1754.96	8	NE	0	37.5	3.5	1.20	0	760.3	0	1.20	30	52
27	1754.87	8	NE	0	39.0	4.0	1.20	0	759.4	0	1.20	15	48
28	1754.78	5	NE	0	40.0	4.0	1.10	0	759.7	0	1.20	15	38
29	1754.70	0	-	0	34.0	4.0	1.10	0	760.1	0	1.10	15	30
30	1754.68	16	NE	0	36.0	4.0	1.10	0	759.7	0	1.10	0	31
31	1754.71	12	NE	0.32	39.0	4.0	1.10	0	755.0	0.22	1.20	30	31

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.
*Estimated reading. Gage malfunction (frozen).

APPENDIX B-2 (CONTINUED) MONTH OF FEBRUARY, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1754.66	4	SE	0.43	44.0	4.0	1.10	0	757.6	0.21	1.10	30	31
2	1754.50	0	-	0.12	42.0	4.0	1.10	0	760.1	0.05	1.10	15	31
3	1754.47	36	NE	0	48.0	4.0	1.30	0	757.2	0	1.10	0	41
4	1754.37	8	NE	0	47.0	4.0	1.20	0	757.8	0	1.10	20	40
5	1754.26	28	NE	0	46.5	4.0	1.10	0	758.2	0.02	1.20	-	45
6	1754.15	10	NE	0	46.5	4.0	1.10	0	758.5	0.03	1.20	20	47
7	1754.06	50	SE	0	48.5	4.5	1.20	0	758.8	0	1.40	20	44
8	1753.91	28	NE	0	49.0	4.5	1.20	0	758.7	0	1.40	20	51
9	1753.77	5	SW	0.03	47.5	4.5	1.00	0	757.9	0.02	1.40	20	50
10	1753.70	18	SW	0.43	45.0	4.5	1.00	0	756.5	0.23	1.40	20	66
11	1753.88	0	-	0.28	44.0	4.5	1.00	0	755.6	0.27	1.70	20	60
12	1753.93	5	SW	0.16	46.0	4.5	1.00	0	755.5	0.10	1.70	20	52
13	1754.47	4	NE	0.38	42.5	4.5	1.00	0	756.4	0.23	1.40	30	56
14	1754.55	8	NE	0	43.0	5.0	1.00	0	756.8	0	1.50	30	56
15	1754.52	3	NE	0.03	46.5	5.0	1.00	0	757.2	0.02	1.10	30	59
16	1754.47	5	NE	0.02	46.5	5.0	1.00	0	757.6	0.02	1.10	30	58
17	1754.45	5	SW	0.23	47.0	5.0	0.85	0	758.1	0.12	0.90	30	55
18	1754.54	6	NE	0.43	42.0	5.0	0.90	0	758.7	0.16	1.30	30	58
19	1754.63	38	NE	0	49.0	5.0	1.00	0	758.5	0	1.20	20	55
20	1754.62	5	NE	0	52.5	5.0	1.00	0	758.0	0	1.10	20	54
21	1754.66	40	SW	0.27	48.5	5.0	1.00	0	757.6	0.26	1.10	20	55
22	1754.65	26	NW	0.20	57.0	5.0	1.00	0	756.6	0.12	1.10	30	60
23	1754.66	5	NE	0.35	43.5	5.0	1.00	0	756.9	0.60	1.00	30	59
24	1754.63	5	NE	0	44.0	5.0	0.90	0	757.5	0	1.15	15	47
25	1754.66	6	SW	0.65	37.0	5.0	0.90	0	758.2	0.38	1.15	15	28
26	1754.68	3	SW	0.30	34.0	4.5	1.00	0	758.9	0.16	1.50	15	27
27	1754.73	6	SW	0.63	37.0	4.5	1.00	0	759.5	0.33	1.15	15	30
28	1755.15	3	NW	0.53	39.5	5.0	1.00	0	757.4	0.35	1.00	0	28
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Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MARCH, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1755.45	0	-	0.37	39.0	5.0	1.00	0	757.1	0.45	0.90	15	28
2	1755.56	5	SW	0.18	36.0	5.0	1.00	0	757.7	0.12	1.20	15	28
3	1755.65	5	SW	0.64	39.0	5.0	0.75	0	758.3	0.75	1.00	15	30
4	1755.68	5	NE	0.10	35.0	5.0	0.70	0	758.9	0.06	1.00	15	27
5	1755.88	8	NE	0	39.0	5.0	0.90	0	757.3	0	1.10	0	28
6	1755.98	1	N	0	44.0	5.0	0.70	0	754.8	0.01	1.00	0	29
7	1756.06	5	SE	0.48	44.0	5.0	0.90	0	756.2	0.27	1.00	15	27
8	1756.36	8	NW	0.84	43.5	5.0	0.90	0	757.3	0.53	1.00	15	27
9	1756.77	5	NW	0.90	37.5	5.0	0.90	0	755.9	0.50	1.00	0	25
10	1757.04	4	W	0.36	43.0	5.0	0.60	0	754.4	0.13	1.10	0	18
11	1757.24	42	NE	0	36.0	5.0	1.10	0	755.7	0	1.20	15	12
12	1757.27	3	NW	0.60	40.0	5.0	0.90	0	757.5	0.50	1.00	0	12
13	1757.42	0	-	0.17	38.0	5.0	0.90	0	756.4	0.13	1.00	0	12
14	1757.53	5	NE	0.45	38.0	4.5	0.90	0	755.3	0.20	1.00	0	12
15	1757.65	10	SE	0.28	38.0	4.5	0.80	0	756.4	0.17	1.00	15	12
16	1757.67	0	-	0.18	28.0	4.5	0.80	0	756.2	0.12	1.00	15	12
17	1757.71	4	NE	0.04	38.0	5.0	0.60	0	758.0	0.03	1.00	0	12
18	1757.80	4	SW	0.31	39.0	5.0	0.60	0	756.8	0.11	1.00	0	12
19	1757.87	10	SW	0.35	36.0	5.0	0.60	0	755.7	0.47	1.00	15	12
20	1757.93	8	NW	0.21	37.5	4.5	0.80	0	757.7	0.08	0.90	15	12
21	1757.94	5	NW	0.34	38.0	4.5	0.80	0	759.6	0.23	1.00	0	12
22	1758.11	8	NE	0.27	39.0	5.0	0.80	0	758.8	0.18	0.90	0	12
23	1758.49	3	SE	0.48	43.0	5.0	0.70	0	757.5	0.34	0.90	0	13
24	1758.87	4	SW	0.27	45.0	5.5	0.50	0	756.3	0.20	0.85	0	13
25	1759.10	4	NE	0.24	40.0	5.0	0.50	0	755.0	0.06	0.85	0	11
26	1759.31	20	NW	0.15	39.0	5.0	0.60	0	754.0	0.12	0.80	15	12
27	1759.70	3	SW	1.20	37.0	5.0	0.60	0	755.9	0.66	0.80	15	11
28	1759.94	0	-	0.38	37.5	5.0	0.60	0	758.0	0.25	0.90	15	11
29	1760.03	0	-	0.10	38.0	5.0	0.60	0	759.7	0.08	0.90	0	11
30	1760.15	9	NE	0.02	35.5	5.0	1.00	0	757.0	0	0.85	0	12
31	1760.32	3	NW	0	42.5	5.0	0.90	0	757.5	0	0.80	0	13

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF APRIL, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1760.49	0	-	0.57	43.5	5.0	0.90	0	756.5	0.44	0.80	0	12
2	1760.67	5	N	0	41.5	5.0	0.95	0	755.2	0.01	0.80	0	11
3	1760.80	7	NE	0	41.5	5.0	0.92	0	754.0	0	0.80	0	12
4	1760.93	9	NE	0.02	46.0	5.5	0.88	0	752.8	0	0.80	0	11
5	1761.04	9	NE	0	51.0	5.5	0.89	0	754.4	0	0.80	15	10
6	1761.35	15	N	0	60.0	6.0	0.94	0	756.2	0	0.80	15	10
7	1761.87	36	SE	0	61.5	7.0	1.10	0	757.9	0	0.80	15	11
8	1762.47	0	-	0.17	60.0	7.0	1.00	0	757.7	0.14	0.80	0	10
9	1763.30	3	SW	0.75	56.0	6.4	0.97	0	756.6	0.56	0.80	0	10
10	1763.38	11	NE	0.24	40.5	6.0	0.95	0	755.2	0.09	0.70	0	11
11	1763.64	0	-	0.24	39.0	6.0	1.00	0	754.1	0.04	0.70	0	11
12	1763.81	9	NE	0	45.5	6.0	1.00	0	755.5	0	0.70	15	12
13	1764.00	10	SW	0.44	49.5	6.0	0.98	0	757.6	0.19	0.70	15	12
14	1764.37	0	-	0.79	35.5	5.5	1.00	0	757.4	0.59	0.70	0	12
15	1764.64	20	NE	0.30	37.5	6.0	1.10	0	756.2	0.23	0.70	0	12
16	1764.86	5	S	0.71	43.0	6.1	1.00	0	758.3	0.60	0.70	35	32
17	1765.03	0	-	0.74	36.0	6.0	1.00	0	760.0	0.19	0.70	35	47
18	1765.08	5	S	0.19	41.0	6.0	1.00	0	759.2	0.10	0.70	35	59
19	1765.08	0	-	0	39.0	6.0	1.00	0	758.2	0	0.60	35	75
20	1765.04	13	NE	0.06	39.0	6.5	0.60	0	758.5	0.01	0.65	35	72
21	1765.00	7	N	0	47.0	6.5	0.74	0	758.0	0	0.65	35	72
22	1764.98	25	NE	0.08	48.0	7.5	1.00	0	758.5	0.06	0.65	35	62
23	1765.10	0	-	0	56.0	7.0	0.75	0	759.5	0	0.65	35	61
24	1765.40	6	NE	0	59.0	8.0	0.65	0	759.8	0	0.65	35	59
25	1765.68	8	NE	0	62.5	8.0	0.65	0	759.0	0	0.60	35	71
26	1765.77	3	S	0.82	50.5	7.5	0.68	0	759.4	0.50	0.60	75	77
27	1765.70	9	E	0.04	47.0	7.5	0.70	0	760.0	0.01	0.60	75	67
28	1765.62	6	NE	0	55.5	7.5	0.80	0	759.4	0	0.60	75	76
29	1765.54	6	E	0	56.0	8.0	0.60	0	759.2	0	0.60	75	82
30	1765.45	9	N	0	56.5	8.0	0.60	0	759.1	0	0.60	75	76
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MAY, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1765.42	3	NE	0	59.0	8.0	0.60	0	758.8	0	0.60	75	82
2	1765.40	8	S	0.26	55.0	8.0	0.60	0	758.7	0.25	0.60	75	77
3	1765.54	7	SW	1.22	45.5	9.0	0.70	0	759.1	0.67	0.60	75	75
4	1765.57	9	S	0.54	40.5	7.5	0.60	0	759.8	0.24	0.60	75	69
5	1765.55	0	-	0.35	42.0	8.0	0.60	0	760.1	0.21	0.60	75	67
6	1765.43	4	NE	0.09	42.0	8.0	0.60	0	760.1	0.05	0.60	75	67
7	1765.22	8	NE	0.10	46.0	8.0	0.60	0	760.2	0.80	0.50	75	71
8	1765.14	5	S	0.34	53.5	8.0	0.60	0	760.2	0.32	0.40	75	74
9	1765.09	11	NE	0	51.5	8.0	0.60	0	760.1	0	0.40	75	69
10	1765.08	10	S	0.02	58.0	8.5	0.60	0	760.0	0.02	0.40	35	72
11	1765.32	5	S	1.21	41.0	8.0	0.60	0	759.0	1.10	0.50	20	63
12	1765.33	5	NE	0.08	42.0	8.0	0.60	0	758.7	0.05	0.50	33	63
13	1765.25	3	NE	0	44.5	8.0	0.60	0	757.9	0	0.60	35	71
14	1765.23	3	S	0.18	49.0	8.0	0.60	0	757.9	0.13	0.60	35	74
15	1765.24	1	S	0.17	45.0	8.3	0.60	0	757.6	0.05	0.53	35	70
16	1765.23	0	-	0.19	46.0	8.0	0.60	0	756.8	0.16	0.60	35	73
17	1765.17	0	-	0.16	45.0	8.0	0.60	0	757.7	0.19	0.50	75	75
18	1765.16	0	-	0.31	42.5	8.0	0.60	0	758.7	0.20	0.47	75	72
19	1765.16	0	-	0	46.0	8.0	0.60	0	759.4	0	0.50	75	73
20	1765.12	5	NE	0	50.5	8.0	0.60	0	759.9	0	0.50	75	73
21	1765.14	9	S	0.49	53.0	8.4	0.56	0	760.1	0.11	0.45	35	65
22	1765.27	0	-	0	49.0	8.5	0.54	0	760.1	0	0.45	35	66
23	1765.27	4	S	0.06	52.5	8.5	0.54	0	759.9	0.07	0.50	35	68
24	1765.41	3	NE	1.16	41.5	8.5	0.54	0	759.6	0.80	0.50	35	70
25	1765.47	12	NE	0.22	48.0	8.4	0.55	0	759.1	0.25	0.55	35	72
26	1765.45	8	SW	0.63	51.5	8.0	0.60	0	758.3	0.32	0.50	35	72
27	1765.43	4	NE	0.13	50.5	8.5	0.60	0	759.1	0.13	0.70	35	74
28	1765.43	10	NE	0.68	50.0	8.3	0.55	0	759.0	0.22	0.75	30	71
29	1765.46	3	S	0.55	42.0	8.0	0.50	0	759.0	0.21	0.60	35	66
30	1765.43	14	NE	0	50.0	8.5	0.54	0	759.3	0	0.60	35	65
31	1765.39	11	NE	0.35	52.5	8.5	0.50	0	759.1	0.39	0.60	35	68

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JUNE, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1765.50	3	W	0.71	52.0	8.5	0.50	0	758.9	0.48	0.60	35	71
2	1765.53	6	SW	0.05	49.5	8.5	0.60	0	758.3	0.03	0.60	35	70
3	1765.44	0	-	0.03	52.0	8.5	0.60	0	759.1	0	0.40	75	71
4	1765.47	5	N	0.68	50.5	8.5	0.46	0	759.3	0.48	0.40	35	74
5	1765.52	12	NE	0.10	54.5	8.5	0.50	0	758.8	0.16	0.40	35	76
6	1765.52	5	N	0	68.5	9.2	0.48	0	757.7	0	0.40	35	78
7	1765.49	7	N	0	74.5	10.5	0.50	0	757.9	0	0.44	75	82
8	1765.42	4	S	0.12	60.0	10.0	0.50	0	758.7	0	0.40	75	79
9	1765.35	4	NE	0	52.0	9.0	0.50	0	759.8	0	0.40	75	69
10	1765.27	2	NE	0	56.5	9.0	0.60	0	759.9	0	0.40	35	66
11	1765.20	1	S	0	58.0	9.5	0.45	0	759.7	0	0.45	35	70
12	1765.13	0	-	0	60.0	9.5	0.45	0	759.3	0	0.45	35	71
13	1765.02	0	-	0	50.0	9.5	0.42	0	758.7	0	0.45	35	76
14	1764.94	3	S	0	61.0	10.0	0.42	0	759.4	0	0.45	35	68
15	1764.85	4	S	0	56.0	9.5	0.40	0	760.5	0	0.45	20	40
16	1764.78	4	NE	0	54.5	9.5	0.30	0	760.2	0	0.45	20	38
17	1764.80	4	NE	0	60.0	10.0	0.40	0	754.4	0	0.45	0	41
18	1764.80	5	S	0	66.0	10.0	0.40	0	756.0	0	0.40	20	51
19	1764.72	6	SW	0	61.0	10.0	0.40	0	756.3	0	0.40	20	48
20	1764.69	0	-	0	58.0	10.0	0.30	0	756.7	0	0.40	20	43
21	1764.62	4	SW	0.29	56.0	10.0	0.30	0	757.3	0.06	0.40	20	42
22	1764.57	5	S	0.19	58.0	9.6	0.35	0	756.3	0.06	0.40	20	53
23	1764.52	0	-	0.03	62.0	9.5	0.30	0	755.5	0	0.40	25	62
24	1764.44	6	NE	0	64.5	10.0	0.30	0	755.5	0	0.40	75	77
25	1764.17	3	S	0	62.5	10.0	0.35	0	756.7	0	0.40	75	81
26	1763.96	0	-	0	58.5	10.0	0.60	0	757.1	0	0.50	75	71
27	1763.75	0	-	0.04	60.0	10.0	0.58	0	757.7	0	0.50	75	80
28	1763.54	1	NE	0	57.0	10.0	0.60	0	758.5	0	0.50	75	77
29	1763.31	2	S	0	56.5	10.0	0.55	0	759.7	0	0.45	75	73
30	1763.23	5	NE	0	58.0	10.0	0.50	0	758.6	0	0.40	35	71
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JULY, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1762.90	2	N	0	64.0	10.0	0.50	0	758.6	0	0.50	75	84
2	1762.73	7	S	0.56	52.5	9.5	0.55	0	759.0	0.24	0.45	35	80
3	1762.62	10	NE	0.41	52.0	9.5	0.57	0	760.2	0.06	0.50	15	54
4	1762.56	0	-	0.40	50.0	9.5	0.55	0	759.3	0.42	0.45	15	50
5	1762.54	0	-	0.60	51.5	9.5	0.55	0	758	0.63	0.45	15	48
6	1762.53	6	N	0.12	52.5	9.5	0.55	0	759.1	0.02	0.45	20	44
7	1762.43	6	N	0	57.0	9.5	0.55	0	757.6	0	0.45	20	40
8	1762.32	0	-	0	61.5	11.0	0.55	0	759.3	0	0.45	20	50
9	1762.22	2	S	0.03	59.5	11.0	0.50	0	759.2	0	0.40	20	52
10	1762.10	4	SW	0	57.0	11.0	0.40	0	759.3	0	0.40	20	47
11	1761.96	0	-	0.04	56.5	11.0	0.50	0	758.9	0.05	0.40	20	51
12	1761.87	3	SW	0.42	54.0	11.0	0.40	0	759.8	0.27	0.54	20	41
13	1761.88	0	-	0.16	56.5	11.0	0.40	0	758.3	0.11	0.40	0	31
14	1761.85	3	S	0	54.0	10.0	0.40	0	758.8	0	0.40	20	32
15	1761.71	4	NE	0	59.5	10.0	0.40	0	759.2	0	0.45	20	40
16	1761.59	2	S	0	60.5	11.0	0.40	0	759.6	0	0.40	20	46
17	1761.54	2	S	0.30	59.0	11.0	0.40	0	760.4	0.03	0.40	20	37
18	1761.53	4	NE	0.07	52.0	10.0	0.40	0	759.3	0	0.40	10	31
19	1761.49	6	NE	0	57.0	10.0	0.40	0	757.9	0	0.40	15	43
20	1761.34	3	NE	0	60.0	10.5	0.45	0	758.6	0	0.40	35	55
21	1761.15	0	-	0	63.5	11.0	0.42	0	759.1	0	0.40	30	62
22	1761.06	2	NE	0	61.0	11.0	0.45	0	759.8	0	0.45	15	57
23	1760.82	2	N	0	65.0	11.0	0.40	0	759.3	0	0.40	35	66
24	1760.61	4	NE	0	69.0	11.0	0.40	0	759.1	0	0.40	35	65
25	1760.42	3	S	0	68.0	11.0	0.40	0	758.8	0	0.20	35	71
26	1760.21	4	S	0	65.5	11.0	0.55	0	758.9	0	0.20	35	70
27	1760.01	0	-	0	60.5	11.0	0.40	0	759.7	0	0.20	35	58
28	1759.79	3	N	0.12	66.0	11.0	0.40	0	758.5	0.04	0.20	35	70
29	1759.57	2	S	0.03	59.5	11.0	0.40	0	758.0	0.02	0.20	45	81
30	1759.35	5	S	0	62.0	11.0	0.40	0	757.4	0	0.20	45	80
31	1759.12	5	NE	0	68.5	11.0	0.30	0	756.8	0	0.20	45	84

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF AUGUST, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1758.89	7	NE	0	72.0	11.5	0.40	0	756.0	0	0.20	45	83
2	1758.62	5	N	0	72.0	11.5	0.40	0	756.1	0	0.20	75	84
3	1758.37	3	N	0	72.5	12.0	0.40	0	756.1	0	0.20	75	83
4	1758.09	0	-	0	72.5	12.0	0.40	0	756.2	0	0.20	75	83
5	1757.84	0	-	0	70.0	12.0	0.40	0	756.3	0	0.20	75	83
6	1757.59	2	NE	0	71.0	12.0	0.40	0	756.4	0	0.20	75	84
7	1757.30	6	NE	0	72.0	12.0	0.30	0	756.5	0	0.20	75	84
8	1757.02	4	N	0	72.0	12.0	0.40	0	756.5	0	0.20	75	84
9	1756.74	5	NE	0	68.0	12.0	0.40	0	756.6	0	0.20	75	85
10	1756.45	6	NE	0	70.0	12.0	0.40	0	756.9	0	0.20	75	84
11	1756.18	6	NE	0	70.5	12.0	0.40	0	756.6	0	0.20	75	84
12	1755.91	5	NE	0	72.0	12.5	0.40	0	756.6	0	0.20	75	84
13	1755.62	6	NE	0	71.0	12.5	0.40	0	756.9	0	0.20	75	83
14	1755.37	2	NE	0	73.5	12.0	0.42	0	756.6	0	0.20	75	88
15	1755.07	0	-	0	69.5	12.5	0.40	0	756.7	0	0.20	75	84
16	1754.78	3	NE	0	71.5	12.5	0.40	0	756.7	0	0.20	75	85
17	1754.51	6	NE	0	75.0	12.5	0.40	0	756.7	0	0.20	75	85
18	1754.23	0	-	0	60.0	12.5	0.40	0	756.8	0	0.20	75	84
19	1753.93	0	-	0	68.0	12.5	0.40	0	756.9	0	0.20	75	83
20	1753.65	0	-	0	62.5	12.0	0.40	0	757.1	0	0.20	75	84
21	1753.36	2	S	0.02	63.5	12.0	0.40	0	757.2	0	0.40	75	83
22	1753.06	3	SE	0.10	54.5	12.0	0.40	0	758.1	0.03	0.40	75	80
23	1752.80	0	-	0.11	56.5	12.0	0.45	0	758.7	0.15	0.40	75	79
24	1752.70	0	-	1.67	54.5	12.0	0.45	0	759.5	1.71	0.40	75	78
25	1752.71	7	SW	0.94	54.0	12.0	0.40	0	759.2	1.19	0.40	35	71
26	1752.83	2	S	0.50	51.0	12.0	0.45	0	760.5	0.71	0.40	35	59
27	1753.03	0	-	0.18	52.0	12.0	0.45	0	757.6	0.25	0.40	0	34
28	1753.20	12	N	0.09	55.0	12.0	0.45	0	754.5	0.19	0.45	0	35
29	1753.42	6	S	0.32	53.5	12.0	0.40	0	754.6	0.17	0.40	15	33
30	1753.72	0	-	0.78	49.5	12.0	0.40	0	756.6	0.83	0.40	35	37
31	1753.85	0	-	0.05	51.5	12.0	0.40	0	759.2	0.03	0.50	35	34

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF SEPTEMBER, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1753.84	4	NE	0	55.5	-	0.40	0	760.4	0	0.45	25	37
2	1753.92	0	-	0	58.0	-	0.40	0	757.1	0	0.45	0	37
3	1754.12	0	-	0.46	52.0	-	0.35	0	754.1	0.39	0.45	0	36
4	1754.32	2	S	0.46	61.0	-	0.40	0	754.4	0.55	0.45	15	35
5	1754.61	2	S	0.10	61.0	-	0.40	0	754.8	0.05	0.45	15	32
6	1754.68	3	N	0	59.0	-	0.40	0	754.7	0	0.45	15	35
7	1754.69	6	NE	0	59.0	-	0.40	0	754.9	0	0.45	15	38
8	1754.71	0	-	0.35	50.5	-	0.45	0	755.5	0.29	0.45	15	35
9	1754.68	2	NE	0	53.5	13.0	0.45	0	756.0	0	0.45	15	37
10	1754.63	1	NE	0	51.5	13.0	0.45	0	756.5	0	0.45	15	38
11	1754.54	4	N	0	55.0	12.0	0.45	0	756.9	0	0.45	15	37
12	1754.45	4	N	0	62.0	14.0	0.45	0	757.3	0	0.50	15	36
13	1754.33	4	N	0	65.0	14.0	0.50	0	757.6	0	0.50	15	39
14	1754.29	4	SW	0.02	64.0	14.0	0.50	0	756.5	0.03	0.50	15	38
15	1754.14	0	-	0.40	55.5	14.0	0.50	0	757.6	0.02	0.50	35	37
16	1753.95	0	-	0.03	52.0	13.0	0.50	0	760.3	0.02	0.50	35	34
17	1753.84	0	-	0.02	52.5	13.0	0.45	0	759.9	0	0.45	15	34
18	1753.83	8	E	0.01	55.5	13.0	0.50	0	758.0	0.03	0.50	0	31
19	1753.82	0	-	0.06	52.0	13.0	0.45	0	755.0	0.04	0.45	0	31
20	1753.81	12	S	0.72	50.5	13.0	0.50	0	755.7	0.72	0.50	35	30
21	1753.92	0	-	1.0	47.0	13.0	0.50	0	756.4	1.50	0.50	15	27
22	1754.03	4	N	0.08	48.0	13.0	0.60	0	756.7	0.06	0.60	15	33
23	1754.04	14	NE	0.16	50.5	13.0	0.60	0	757.4	0.18	0.60	15	30
24	1754.10	6	S	0.62	46.0	13.0	0.55	0	758.5	0.52	0.60	15	26
25	1754.30	12	E	0.24	48.0	13.0	0.60	0	759.4	0.09	0.60	15	24
26	1754.36	3	N	0.13	46.5	13.0	0.60	0	760.1	0.11	0.60	15	24
27	1754.44	9	NE	0	52.5	13.0	0.60	0	758.3	0	0.60	0	27
28	1754.45	0	-	0.20	52.0	13.5	0.55	0	758.6	0.08	0.50	10	27
29	1754.46	4	W	0.64	53.5	13.0	0.60	0	758.6	0.43	0.50	15	24
30	1754.54	0	-	0.62	47.0	13.0	0.60	0	758.6	0.48	0.50	15	24
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF OCTOBER, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1754.60	6	N	0	48.0	13.0	0.60	0	756.2	0	0.50	0	34
2	1754.66	3	NE	0	50.0	13.0	0.60	0	752.6	0	0.50	0	42
3	1754.65	6	NE	0	47.5	12.5	0.60	0	751.7	0	0.50	15	47
4	1754.51	18	NE	0	50.0	13.0	0.60	0	751.6	0	0.60	35	58
5	1754.30	26	NE	0	47.5	13.0	0.60	0	752.2	0	0.50	35	61
6	1754.10	14	NE	0	55.0	13.0	0.50	0	752.7	0	0.50	35	66
7	1753.94	2	SW	0.33	49.0	12.5	0.60	0	753.9	0.20	0.50	35	59
8	1753.75	6	S	0	51.5	13.0	0.60	0	751.8	0	0.50	35	54
9	1753.62	2	S	0.29	45.0	12.0	0.60	0	755.2	0.20	0.50	35	65
10	1753.50	20	NE	0.03	45.0	12.0	0.60	0	756.0	0.02	0.50	35	59
11	1753.30	25	NE	0	47.0	12.0	0.60	0	756.2	0	0.50	35	64
12	1753.10	17	NE	0	63.5	12.0	0.60	0	756.8	0	0.50	35	64
13	1753.01	0	-	0.72	53.0	12.0	0.60	0	757.3	0.51	0.50	35	61
14	1752.88	4	NE	0	52.5	12.0	0.60	0	757.8	0	0.50	35	64
15	1752.68	18	NE	0	53.5	12.0	0.70	0	758.2	0	0.60	35	64
16	1752.51	4	N	0.36	53.0	12.0	0.70	0	758.5	0.24	0.60	35	57
17	1752.33	6	NE	0	52.5	12.0	0.60	0	758.9	0	0.60	35	74
18	1752.13	17	NE	0	52.0	12.0	0.60	0	758.7	0	0.60	35	70
19	1751.92	0	-	0.02	52.0	12.0	0.60	0	758.8	0.03	0.50	35	71
20	1751.73	6	N	0	44.5	12.0	0.60	0	758.2	0	0.50	35	69
21	1751.51	12	NE	0.05	51.0	11.5	0.60	0	757.2	0.04	0.50	35	78
22	1751.30	22	NE	0	49.5	12.0	0.60	0	756.7	0	0.50	35	72
23	1751.09	15	SW	0.36	50.5	12.0	0.70	0	757.2	0.20	0.50	35	75
24	1750.90	15	NE	0.03	46.0	11.5	0.65	0	755.2	0	0.50	35	77
25	1750.96	5	NE	0.90	49.5	11.5	0.75	0	755.4	0.73	0.60	60	78
26	1751.16	2	SW	0.65	47.0	11.0	0.70	0	756.5	0.35	0.60	60	67
27	1751.20	38	NE	0	46.0	11.0	0.80	0	757.0	0	0.60	60	77
28	1751.07	12	NE	0	48.0	11.0	0.75	0	757.4	0	0.60	60	79
29	1750.98	8	NE	0.57	48.0	11.0	0.70	0	758.6	0.41	0.60	60	71
30	1750.90	14	S	0.86	45.0	11.0	0.80	0	759.6	0.45	0.60	60	72
31	1751.25	0	-	0.09	41.0	10.5	0.80	0	760.1	0.05	0.70	60	73

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF NOVEMBER, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1751.40	26	SW	0.32	44.0	10.0	0.80	0	760.0	0.41	0.70	35	68
2	1753.00	7	SW	0.42	46.5	10.0	0.95	0	757.2	0.42	0.70	15	70
3	1753.37	15	NE	0.03	39.0	10.0	1.40	0	757.0	0.04	0.70	15	54
4	1753.39	36	NE	0.05	39.0	9.5	1.20	0	759.9	0.07	0.70	35	29
5	1753.27	22	NE	0.14	40.5	9.0	1.50	0	760.9	0.11	0.80	35	25
6	1753.23	5	NE	0.26	40.5	9.0	1.40	0	760.9	0.31	0.90	35	26
7	1753.45	0	-	0.95	38.0	9.0	1.40	0	760.7	0.62	0.90	35	25
8	1753.75	7	NE	0.14	36.5	9.0	1.40	0	758.7	0.04	1.00	0	28
9	1754.00	27	NE	0.18	34.5	8.5	1.40	0	756.4	0.15	1.00	0	24
10	1754.80	4	SW	0.63	44.0	8.5	1.40	0	759.3	0.48	1.00	35	26
11	1755.44	20	NE	0.17	49.0	8.5	2.00	30	760.2	0.15	1.00	15	25
12	1755.50	5	NE	0.36	46.0	8.5	1.80	30	760.3	0.25	1.00	15	26
13	1757.14	0	SE	0.48	43.5	8.5	1.90	30	760.2	0.24	1.05	15	26
14	1755.5	12	SW	0.38	40.5	8.5	1.70	30	760.1	0.27	1.10	15	28
15	1755.70	9	S	0.41	39.0	8.5	1.20	30	760.1	0.34	1.00	15	27
16	1755.63	1	S	0.40	38.0	8.5	1.20	40	760.2	0.43	1.00	15	26
17	1755.63	0	-	0.05	34.5	8.0	1.20	40	760.2	0.04	0.95	15	26
18	1755.11	11	NE	0.27	30.5	7.5	1.20	50	760.2	0.07	0.95	15	25
19	1754.52	6	NE	0	29.0	7.0	1.20	50	760.3	0	0.90	15	25
20	1753.89	35	NE	0	28.0	7.0	1.20	50	760.3	0	0.90	15	25
21	1753.17	34	NE	0	19.5	6.0	1.50	50	760.1	0	0.90	15	27
22	1752.55	30	NE	0	18.5	5.5	1.80	50	758.8	0	0.90	0	30
23	1751.88	9	NE	0.03	20.0	5.5	1.70	50	755.0	0.40	0.90	0	32
24	1751.25	7	SW	0.65	41.5	5.5	1.60	50	755.0	0.47	0.90	15	35
25	1750.62	26	NE	0.53	42.5	5.5	1.60	50	756.0	0.36	0.90	15	27
26	1753.45	8	NE	2.10	45.5	5.5	3.50	50	757.1	1.45	1.20	15	71
27	1753.96	16	N	0.39	40.0	5.5	2.00	50	758.2	0.20	1.10	15	26
28	1754.42	6	SW	0.59	41.0	5.0	1.80	50	759.0	0.15	1.40	15	25
29	1755.11	3	SW	0.86	42.0	4.5	1.80	50	760.0	0.34	1.40	15	27
30	1755.14	12	NE	0	39.5	5.0	1.60	70	758.0	0	1.30	0	26
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF DECEMBER, 1977.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1754.65	9	SW	0.70	37.5	4.5	2.20	70	755.9	0.54	1.00	0	26
2	1758.43	30	SW	2.00	47.0	4.5	3.80	0	755.8	0.77	1.00	15	27
3	1758.57	30	SW	0.28	45.5	5.0	3.20	0	756.8	0.11	1.40	15	22
4	1758.10	6	S	0.46	37.0	5.0	3.60	0	757.9	0.61	1.30	15	20
5	1757.77	6	NE	0.27	35.0	4.5	3.90	0	758.9	0.24	1.30	15	19
6	1757.40	10	S	0.60	37.5	4.5	4.60	0	758.1	0.46	1.50	0	20
7	1757.70	2	S	0.32	35.0	4.5	4.80	0	756.3	0.14	1.90	0	19
8	1757.69	15	NW	0.08	34.0	4.0	5.00	0	754.5	0.10	1.80	0	20
9	1757.46	12	SE	0.12	33.5	4.0	5.00	0	752.7	0.09	1.60	0	18
10	1756.62	4	SW	0.67	36.5	4.0	4.90	75	751.5	0.42	2.00	15	19
11	1758.12	12	NE	1.47	44.5	4.0	4.50	0	752.0	1.29	2.00	0	20
12	1758.63	21	SW	1.28	48.0	4.4	4.60	0	750.0	0.76	2.10	0	19
13	1758.18	3	SW	0.50	43.5	4.0	4.40	0	753.1	0.38	2.80	35	20
14	1758.35	20	NE	1.01	44.0	4.5	4.20	0	756.9	0.71	3.60	35	18
15	1758.12	10	SW	0.51	43.0	4.5	4.00	0	759.0	0.42	3.40	35	28
16	1757.90	3	NE	1.60	38.5	4.0	4.00	0	758.9	1.52	4.00	35	59
17	1757.52	2	SW	0.03	39.0	4.0	3.16	0	758.9	0.02	4.90	35	68
18	1757.30	4	NE	0.24	33.5	4.0	3.50	0	759.1	0.21	3.80	35	58
19	1757.14	0	-	0.22	33.5	4.0	3.60	0	759.5	0.07	3.90	35	62
20	1755.92	54	NE	0	29.0	3.5	5.20	100	758.5	0	4.00	35	69
21	1754.46	52	NE	0	39.0	3.5	5.80	100	758.9	0	2.30	35	63
22	1753.07	15	NE	0	38.0	3.5	4.60	100	755.0	0	4.00	0	61
23	1751.74	4	NE	0	36.0	3.5	4.20	100	750.1	0	4.20	0	64
24	1750.24	0	-	0.10	38.0	3.0	3.90	100	748.5	0.09	4.50	35	57
25	1748.23	2	NE	0.22	36.5	3.0	3.00	100	748.0	0.11	4.20	35	59
26	1748.45	34	NE	0	36.0	3.0	3.40	0	751.0	0	4.00	35	56
27	1748.15	38	NE	0	29.0	3.0	3.40	0	751.8	0	3.90	35	57
28	1748.84	42	NE	0	33.0	2.5	3.60	0	752.8	0	3.90	35	51
29	1747.67	11	NE	0.42	35.0	2.5	3.40	0	754.5	0.34	3.80	35	46
30	1747.60	0	-	0.28	34.0	2.5	3.40	0	756.2	0.07	3.80	35	47
31	1747.57	30	NE	0	30.5	2.5	3.00	0	758.1	0	3.70	20	37

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JANUARY, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel. mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1747.46	38	NE	0	24.5	2.0	6.0	0	759.9	0	3.7	20	27
2	1746.48	37	NE	0	27.5	1.5	4.0	0	758.0	0	3.5	0	23
3	1747.50	6	NE	1.10	25.0	1.5	4.0	0	755.4	0.78	3.5	0	27
4	1748.12	15	NW	1.10	41.5	3.0	3.8	0	755.9	0.53	3.5	15	28
5	1749.36	12	SE	0.70	43.0	2.0	3.8	0	756.8	0.40	3.5	15	28
6	1749.68	7	NW	0.73	39.0	2.0	3.5	50	756.9	0.43	3.7	15	27
7	1749.20	24	NE	0.22	41.5	1.5	3.0	50	758.8	0.30	3.7	15	25
8	1748.85	29	NE	0.97	38.0	1.5	3.2	50	759.7	1.16	3.6	15	25
9	1749.47	45	SE	0.08	40.5	3.0	3.2	0	760.1	0.05	3.6	15	24
10	1749.72	4	SE	0.10	42.0	2.0	2.9	0	758.3	0.08	3.6	0	26
11	1749.90	0	-	0.08	41.5	2.0	2.8	0	755.9	0.03	3.5	0	25
12	1749.55	6	NE	0.18	36.5	2.0	3.5	50	753.8	0.19	3.4	0	25
13	1748.88	42	NE	0.26	40.0	2.0	3.4	50	754.1	0.13	3.3	15	26
14	1748.51	46	NE	0.35	40.0	2.0	3.6	20	757.0	0.08	3.3	35	26
15	1748.29	19	NE	0.04	43.5	2.0	3.5	20	760.0	0	3.2	35	25
16	1748.24	30	NE	0	41.0	2.0	3.6	20	758.0	0	3.2	0	24
17	1748.14	6	NE	0.02	41.0	2.0	3.4	0	758.0	0.02	3.2	15	26
18	1748.04	18	NE	0.05	40.0	2.0	3.2	0	758.7	0.04	3.2	15	26
19	1747.91	14	NE	0.02	43.0	2.0	3.1	0	759.5	0.02	3.1	15	24
20	1747.78	6	NE	0.07	44.0	2.0	3.2	0	760.1	0.02	2.5	15	27
21	1747.80	2	N	0.70	41.5	2.5	3.0	0	758.0	0.56	2.5	0	25
22	1748.03	7	SW	0.40	39.0	2.5	3.0	0	755.9	0.26	2.5	0	25
23	1748.09	4	NE	0.20	36.0	2.0	3.0	0	756.1	0.16	2.5	15	24
24	1748.05	4	NE	0	34.0	2.0	2.5	0	757.4	0	2.4	20	26
25	1747.99	6	NE	0.02	40.0	2.0	2.4	0	759.0	0.02	2.2	15	25
26	1748.24	6	NE	1.46	36.0	-	-	0	757.3	1.22	2.2	0	23
27	1748.36	4	NE	0.19	36.0	2.0	2.2	0	757.2	0.22	2.1	15	23
28	1748.38	11	NE	0.01	38.5	2.0	2.2	0	758.4	0.03	2.4	20	28
29	1748.37	0	-	0.20	37.0	2.0	2.2	0	759.9	0.05	2.0	20	31
30	1748.36	26	NE	0	38.0	2.0	2.2	0	760.5	0	2.1	20	25
31	1748.32	22	NE	0.04	35.0	2.0	2.2	0	760.2	0.05	2.1	15	26

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF FEBRUARY, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1748.45	26	NE	0.26	35.0	2.0	2.0	0	758.1	0.26	2.0	0	27
2	1748.63	6	SW	0.86	35.0	2.0	2.0	0	756.1	0.48	2.2	0	24
3	1749.00	6	SW	0.70	41.0	2.0	2.4	0	757.0	0.39	2.7	15	22
4	1749.49	38	NE	0.04	42.5	2.0	2.4	0	757.7	0.02	2.6	20	25
5	1749.73	39	NE	0.02	52.5	2.0	2.4	0	758.3	0	2.5	20	26
6	1750.07	10	NE	0.60	46.0	2.0	2.4	0	759.1	0.46	2.5	15	25
7	1750.32	22	NE	0.05	44.0	2.0	2.2	20	759.5	0.02	2.5	15	28
8	1750.26	10	NE	0.68	43.0	2.0	2.4	30	760.4	0.42	2.6	15	22
9	1750.90	6	NE	0.42	40.5	2.0	2.6	50	757.7	0.36	2.4	0	25
10	1749.35	4	NE	0.23	37.0	3.0	2.5	50	755.6	0.04	2.4	0	26
11	1749.60	0	-	0.07	36.0	3.0	2.4	0	756.4	0.02	2.4	15	25
12	1748.93	46	NE	0	33.5	2.5	2.4	15	757.4	0	2.3	15	24
13	1748.73	22	NE	0.04	35.5	3.0	2.3	15	758.0	0	2.2	15	24
14	1748.52	12	NE	0	40.0	3.0	2.4	15	758.8	0	2.4	15	27
15	1748.34	0	-	0.26	37.0	3.0	2.2	15	758.7	0.28	2.3	15	25
16	1748.17	6	NE	0.03	37.0	3.0	2.1	15	760.3	0	2.3	15	24
17	1748.13	8	NE	0	39.0	3.0	2.0	3	758.2	0.03	2.3	0	24
18	1748.15	4	S	0.20	39.0	2.5	2.0	0	756.0	0.17	2.2	0	24
19	1748.17	4	N	0.38	40.5	2.5	1.8	0	757.2	0.24	2.1	15	23
20	1748.19	14	NE	0	49.0	3.0	1.7	0	758.4	0	2.2	15	23
21	1748.19	3	NE	0	50.0	3.0	1.6	0	759.3	0	2.2	15	24
22	1748.20	4	NE	0.01	47.0	3.0	1.6	0	759.9	0.01	2.0	15	29
23	1748.37	0	-	0.31	49.0	4.0	1.6	0	758.8	0.18	1.9	0	19
24	1748.69	22	NE	0.12	42.0	4.0	1.6	0	757.0	0.11	1.9	0	17
25	1748.77	21	NE	0.18	39.5	3.0	1.6	0	757.0	0.17	1.7	15	31
26	1748.81	0	-	0.42	41.0	3.0	1.6	0	758.0	0.29	1.7	15	28
27	1748.84	4	NE	0	35.0	3.0	1.5	0	759.0	0	1.7	15	23
28	1748.90	12	SW	0.47	35.0	3.0	1.5	0	759.9	0.18	1.8	15	25
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Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MARCH, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1748.90	12	NE	0.23	34.0	3.0	1.40	0	760.3	0.18	1.80	15	24
2	1748.95	30	NE	0	35.5	3.0	1.40	0	758.2	0	1.80	0	24
3	1748.93	26	NE	0	35.0	3.0	1.60	0	758.5	0	1.80	15	24
4	1748.87	28	NE	0.08	35.5	2.8	1.60	0	759.6	0.07	1.80	15	24
5	1748.80	0	-	0	41.5	2.8	1.60	0	760.2	0	1.70	15	26
6	1748.74	8	NE	0	39.0	3.0	1.40	0	760.3	0	1.70	15	24
7	1748.84	16	NE	0.44	44.5	3.0	1.40	0	758.3	0.42	1.70	0	25
8	1749.13	6	NE	0.56	42.5	3.0	1.50	0	756.2	0.36	1.50	15	22
9	1749.22	4	SW	0.04	46.0	3.0	1.40	0	757.2	0.08	1.50	15	24
10	1749.25	4	NE	0	40.0	3.0	1.40	0	758.2	0	1.40	15	24
11	1749.25	0	-	0.11	44.5	3.2	1.40	0	759.3	0.05	1.00	15	23
12	1749.28	0	-	0.30	39.0	3.2	1.40	0	760.2	0.28	1.60	15	23
13	1749.29	14	SW	0.10	38.0	3.0	1.30	0	760.4	0.12	1.80	15	23
14	1749.42	0	-	0.74	37.0	3.0	1.20	0	758.0	0.49	1.70	0	25
15	1749.48	4	NE	0	37.0	3.0	1.00	0	758.9	0	1.70	15	26
16	1749.47	12	NE	0	42.0	5.0	1.20	0	759.7	0	0.17	15	26
17	1749.47	6	NE	0	47.0	3.0	1.20	0	759.6	0	1.60	15	31
18	1749.47	9	NE	0	51.5	4.0	1.20	0	759.8	0	1.50	15	41
19	1749.50	3	NE	0	53.5	4.0	1.40	0	760.2	0	1.50	15	25
20	1749.53	4	NE	0	41.0	4.0	1.40	0	760.2	0	1.50	15	28
21	1749.65	4	NE	0	51.0	5.0	1.40	0	757.4	0	1.40	15	32
22	1748.68	6	NE	0	53.0	5.0	1.40	0	758.0	0	1.40	15	23
23	1749.74	8	NE	0.04	52.0	5.0	1.30	0	759.6	0.05	1.40	15	20
24	1750.17	4	SW	1.21	43.5	5.0	1.40	0	760.2	0.66	1.40	0	31
25	1750.83	3	S	0.77	44.5	5.0	1.40	0	758.1	0.58	1.40	0	24
26	1751.79	0	-	0.87	44.5	5.0	1.20	0	758.1	0.84	1.40	15	25
27	1752.56	8	SW	0.08	43.5	5.0	1.40	0	758.9	0.05	1.40	15	27
28	1752.53	4	NE	0.29	47.0	5.0	1.30	0	759.6	0.33	1.30	15	26
29	1752.92	6	NE	0.15	44.0	5.0	1.30	0	758.2	0.14	1.30	15	24
30	1753.12	0	-	0.02	50.0	5.0	1.20	0	758.9	0.07	1.30	15	25
31	1753.40	14	NE	0.47	39.5	5.0	1.30	0	759.6	0.20	1.30	15	25

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF APRIL, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1753.53	2	S	0.05	49.0	5.5	1.20	0	760.2	0.05	1.3	15	28
2	1753.75	2	N	0.36	40.5	5.5	1.20	0	758.1	0.16	1.2	0	25
3	1754.01	6	NE	0.42	41.0	5.0	1.20	0	755.9	0.25	1.2	15	23
4	1755.11	3	NE	0.30	45.0	6.0	1.40	0	756.6	0.22	1.2	15	25
5	1754.28	8	SW	0.66	37.0	6.0	1.40	0	757.5	0.42	1.2	15	24
6	1754.40	8	NE	0.09	39.0	5.0	1.30	0	758.4	0.09	1.2	15	25
7	1754.47	4	NE	0	44.0	5.0	1.20	0	758.5	0	1.2	15	30
8	1754.52	2	E	0.03	48.0	6.0	1.20	0	757.2	0.03	1.2	15	50
9	1754.55	4	NE	0	45.0	6.0	1.20	0	755.8	0	1.2	25	54
10	1754.53	8	NE	0	51.0	6.0	1.20	0	755.8	0	1.1	25	53
11	1754.52	6	SW	0.51	52.0	6.0	1.20	0	756.4	0.44	1.1	35	58
12	1754.49	3	NE	0	42.5	6.0	1.10	0	756.0	0	1.0	35	64
13	1754.43	3	NE	0	48.0	6.0	1.10	0	755.0	0	1.0	35	78
14	1754.35	6	NE	0.05	43.0	6.0	1.10	0	754.3	0.05	1.0	45	79
15	1754.22	0	-	0.23	43.5	6.0	1.10	0	755.2	0.22	0.90	75	79
16	1754.11	0	-	0.68	44.5	6.0	1.10	0	756.1	0.56	0.90	75	75
17	1754.05	6	NE	0.63	35.0	6.0	1.10	0	757.0	0.49	0.90	75	73
18	1753.97	6	NE	0.27	42.5	6.0	1.00	0	757.8	0.25	0.90	75	78
19	1753.93	0	-	0.20	46.5	6.5	1.00	0	758.7	0.42	0.80	75	75
20	1753.98	6	NE	0.64	44.0	6.0	1.00	0	759.5	0.52	0.80	75	78
21	1754.02	3	NE	0.23	41.0	6.0	1.00	0	758.7	0.16	0.80	35	77
22	1754.10	4	E	0.36	40.5	6.0	1.00	0	759.4	0.23	0.80	35	71
23	1754.44	4	E	0.76	39.0	6.0	0.90	0	755.6	0.60	0.75	0	53
24	1754.54	22	NE	0	47.0	7.0	1.00	0	758.4	0	0.60	35	33
25	1754.56	3	NE	0	53.0	7.5	1.00	0	760.7	0	0.50	0	29
26	1754.84	4	NE	0.12	57.0	7.5	0.90	0	758.4	0.08	0.50	15	25
27	1755.12	3	SW	0.98	47.0	7.0	0.90	0	759.6	0.83	0.50	15	22
28	1755.55	-	Calm	0.13	45.0	7.0	0.80	0	758.3	0.10	0.50	0	22
29	1755.84	2	S	0.02	41.5	7.0	0.70	0	756.0	0.09	0.80	0	25
30	1755.92	2	W	0	49.0	7.0	0.70	0	757.0	0	0.80	15	21
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF MAY, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1755.98	-	Calm	0	48.0	7.0	0.70	0	757.7	0	0.80	15	25
2	1756.00	-	Calm	0.05	48.0	7.0	0.80	0	758.8	0.01	0.70	15	29
3	1756.04	3	SW	0.29	41.0	7.0	0.70	0	760.1	0.31	0.65	0	28
4	1756.24	0	-	0.43	40.0	7.0	0.60	0	757.9	0.39	0.65	15	25
5	1756.30	-	Calm	0.10	41.0	7.0	0.70	0	758.6	0.19	0.60	15	26
6	1756.32	6	E	0	47.5	7.0	0.35	0	759.4	0	0.60	15	25
7	1756.32	4	NE	0	51.5	7.5	0.30	0	760.0	0	0.60	15	27
8	1756.32	8	NE	0	54.0	8.0	0.60	0	760.1	0	0.60	0	31
9	1756.43	-	Calm	0	57.0	8.0	0.60	0	757.4	0	0.60	15	32
10	1756.50	3	SW	0.31	45.0	7.0	0.60	0	758.3	0.28	0.60	15	27
11	1756.76	12	SW	1.06	50.0	7.0	0.60	0	759.3	0.49	0.50	15	25
12	1757.05	3	SW	0.08	46.5	7.0	0.60	0	760.0	0.03	0.50	0	27
13	1757.32	8	N	0.32	51.5	8.0	0.70	0	757.9	0.26	0.50	0	27
14	1757.70	12	NE	0.71	46.5	8.0	0.60	0	758.8	0.33	0.50	15	23
15	1758.12	-	Calm	0.62	45.0	7.0	0.60	0	759.7	0.42	0.50	15	23
16	1758.55	5	SW	0.73	44.0	7.0	0.60	0	760.2	0.36	0.50	0	27
17	1759.04	6	SW	0.52	45.0	7.0	0.60	0	757.7	0.16	0.45	0	26
18	1759.38	6	NE	0.03	48.0	7.0	0.60	0	755.3	0.03	0.45	15	30
19	1759.50	10	NE	0	58.0	8.0	0.60	0	757.2	0	0.45	25	30
20	1759.62	12	E	0	65.0	8.5	0.60	0	757.9	0	0.40	15	32
21	1759.73	10	SW	0	62.5	9.0	0.60	0	757.8	0	0.40	15	35
22	1759.83	6	SW	0.10	48.0	8.0	0.60	0	758.4	0.01	0.40	15	29
23	1759.89	-	Calm	0.33	44.0	8.0	0.55	0	758.8	0.32	0.45	15	29
24	1759.89	3	NE	0	49.0	8.0	0.60	0	759.2	0	0.45	15	28
25	1759.87	4	SW	0	49.0	8.0	0.60	0	759.3	0	0.40	15	31
26	1759.86	3	NE	0.14	50.5	8.0	0.55	0	759.7	0.04	0.40	15	30
27	1759.92	2	E	0.33	50.5	8.0	0.50	0	757.0	0.29	0.40	0	33
28	1760.20	2	S	0.44	47.5	8.0	0.60	0	757.9	0.21	0.40	15	27
29	1760.37	3	SW	0.55	45.0	8.0	0.55	0	759.0	0.26	0.40	15	21
30	1760.47	8	NE	0	47.0	8.0	0.55	0	759.6	0	0.40	15	27
31	1760.48	6	NE	0	54.0	8.0	0.55	0	759.9	0	0.40	15	32

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JUNE, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1760.48	8	NE	0	60.0	9.0	0.55	0	759.9	0	0.40	0	36
2	1760.59	10	NE	0	67.5	9.0	0.55	0	757.2	0	0.40	25	47
3	1760.57	4	NE	0	81.0	10.0	0.50	0	757.2	0	0.40	25	55
4	1760.57	6	NE	0	72.0	10.0	0.50	0	756.4	0	0.40	25	53
5	1760.56	8	NE	0	72.5	10.0	0.55	0	755.7	0	0.40	35	69
6	1760.49	8	NE	0	69.0	10.0	0.55	0	756.0	0	0.40	75	77
7	1760.33	3	NE	0	66.0	10.0	0.55	0	756.8	0	0.35	75	76
8	1760.15	0	-	0	51.0	9.0	0.55	0	758.7	0	0.35	75	64
9	1760.06	14	SW	0	60.0	9.0	0.55	0	760.2	0.36	0.35	0	53
10	1760.16	0	-	0.11	50.5	9.0	0.50	0	757.3	0.02	0.30	0	37
11	1760.17	10	NE	0.11	51.0	9.0	0.50	0	758.8	0.09	0.30	15	33
12	1760.15	8	W	0	58.0	9.0	0.55	0	757.9	0	0.30	25	32
13	1760.13	0	-	0.43	54.0	9.0	0.55	0	759.5	0.40	0.50	15	37
14	1760.18	4	NE	0.23	52.0	9.0	0.55	0	760.0	0.22	0.50	0	31
15	1760.33	4	SW	0.23	54.0	9.0	0.55	0	757.2	0.43	0.50	20	33
16	1760.53	-	Calm	0.34	50.0	9.0	0.55	0	757.8	0.11	0.50	20	36
17	1760.53	2	NE	0	51.5	9.0	0.50	0	758.5	0	0.45	20	42
18	1760.57	0	-	0	60.5	9.5	0.50	0	758.9	0	0.45	20	37
19	1760.54	-	Calm	0	60.0	9.0	0.55	0	758.9	0	0.40	20	45
20	1760.49	6	NE	0	62.0	0.0	0.55	0	757.7	0	0.40	30	60
21	1760.34	0	-	0	65.0	9.0	0.55	0	758.0	0	0.40	70	60
22	1760.17	6	SW	0	59.0	9.0	0.50	0	760.3	0	0.40	0	65
23	1760.13	4	SW	0	58.0	9.0	0.50	0	758.4	0	0.40	15	49
24	1760.03	0	-	0	61.0	9.5	0.55	0	757.6	0	0.40	20	56
25	1759.94	9	-	0.29	55.5	9.0	0.50	0	757.1	0.14	0.40	20	56
26	1759.86	4	NE	0.03	53.0	9.0	0.50	0	757.0	0.02	0.40	20	50
27	1759.75	10	NE	0	63.0	9.0	0.50	0	755.5	0	0.40	35	60
28	1759.56	8	NE	0	72.5	9.5	0.50	0	755.5	0	0.40	75	76
29	1759.37	0	-	0	72.0	10.0	0.50	0	755.6	0	0.40	75	81
30	1759.22	3	SW	0.54	55.0	9.5	0.50	0	757.6	0.32	0.40	35	70
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF JULY, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1759.03	3	S	0	63.5	9.5	0.25	0	758.5	0	0.35	75	68
2	1758.90	0	-	1.39	65.0	9.0	0.30	0	759.6	0.79	0.35	75	69
3	1758.84	5	SW	0.17	54.0	9.0	0.50	0	760.7	0.06	0.40	0	53
4	1758.89	6	SW	0.45	51.5	9.0	0.50	0	757.7	0.18	0.50	15	33
5	1758.90	3	SW	0.12	49.5	9.0	0.50	0	757.3	0.06	0.50	15	38
6	1758.87	6	NE	0	56.0	9.0	0.50	0	757.7	0	0.45	20	37
7	1758.78	-	Calm	0	62.5	9.5	0.50	0	756.6	0	0.50	20	56
8	1758.64	2	S	0	62.5	9.5	0.50	0	758.2	0	0.45	35	66
9	1758.48	0	-	0.02	54.0	9.5	0.50	0	757.3	0	0.45	35	54
10	1758.33	15	S	0.15	52.5	9.0	0.65	0	759.5	0.22	0.50	35	49
11	1758.31	3	SW	0.21	52.5	9.0	0.65	0	758.3	0.08	0.50	0	27
12	1758.27	4	NE	0.03	51.0	9.0	0.65	0	758.3	0.01	0.50	15	30
13	1758.20	8	NE	0	47.0	9.5	0.65	0	757.7	0	0.50	15	39
14	1758.03	11	NE	0	70.5	10.0	0.60	0	757.3	0	0.50	35	62
15	1757.83	2	N	0	71.0	10.0	0.50	0	757.5	0	0.40	35	71
16	1757.66	2	SW	0.27	62.5	10.0	0.50	0	759.2	0.26	0.40	35	56
17	1757.65	3	S	0.62	51.0	9.0	0.60	0	760.3	0.56	0.45	30	34
18	1757.65	0	-	0.02	54.5	9.0	0.60	0	759.4	0.01	0.40	15	32
19	1757.63	3	NE	0	55.5	10.0	0.60	0	757.4	0	0.40	0	25
20	1757.57	4	NE	0	60.0	10.0	0.60	0	758.3	0	0.40	35	51
21	1757.33	9	NE	0	62.0	10.0	0.60	0	758.3	0	0.50	35	59
22	1757.10	8	NE	0	66.0	10.0	0.40	0	759.0	0	0.40	75	74
23	1756.86	12	NE	0	80.0	11.0	0.40	0	758.8	0	0.40	75	75
24	1756.62	0	-	0	70.0	10.0	0.60	0	758.8	0	0.40	75	92
25	1756.37	9	NE	0	70.5	10.5	0.60	0	759.9	0	0.40	75	74
26	1756.16	9	NE	0	74.0	10.0	0.60	0	759.0	0	0.40	35	74
27	1756.08	-	Calm	0.98	66.0	10.0	0.65	0	760.3	0.89	0.40	35	62
28	1756.06	2	S	0	61.0	10.0	0.60	0	757.2	0	0.40	0	38
29	1755.95	6	NE	0	62.0	10.0	0.40	0	757.4	0	0.40	20	35
30	1755.76	9	NE	0	69.0	11.0	0.40	0	757.9	0	0.40	35	46
31	1755.55	0	-	0	67.0	10.0	0.60	0	757.5	0	0.40	35	67

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF AUGUST, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25 % Open	Total Flow, MGD
1	1755.32	0	-	0	62.0	10.0	0.60	0	758.2	0	0.40	35	57
2	1755.12	0	-	0	61.5	10.0	0.60	0	759.4	0	0.40	35	56
3	1754.95	0	-	0	64.0	10.0	0.60	0	759.3	0	0.40	20	49
4	1754.77	0	-	0	67.0	11.0	0.65	0	758.1	0	0.40	20	61
5	1754.60	5	NE	0	63.5	10.5	0.40	0	757.1	0	0.40	20	59
6	1754.40	6	NE	0	61.5	10.5	0.40	0	755.7	0	0.40	30	64
7	1754.22	4	NE	0	71.0	11.0	0.60	0	756.2	0	0.50	30	67
8	1753.95	12	NE	0	73.0	11.0	0.65	0	754.6	0	0.50	75	79
9	1753.67	5	NE	0	75.5	11.0	0.65	0	754.0	0	0.50	75	92
10	1753.37	0	-	0	71.0	11.0	0.70	0	754.1	0	0.50	75	92
11	1753.09	2	NW	0.50	70.5	11.0	0.70	0	756.8	0.01	0.50	75	60
12	1752.90	0	-	0.60	56.5	10.5	0.40	0	758.8	0.35	0.50	30	51
13	1752.74	4	SW	0.24	59.0	11.0	0.40	0	760.0	0.20	0.50	20	42
14	1752.59	2	SW	0.03	60.0	11.0	0.75	0	759.2	0.02	0.50	20	49
15	1752.72	8	SW	1.30	53.5	11.0	0.75	0	758.8	1.06	0.60	20	63
16	1753.28	10	SW	0.71	54.0	11.0	0.90	0	759.9	0.63	0.50	20	41
17	1753.66	3	SW	0.12	54.0	11.0	0.85	0	758.3	0.05	0.50	0	25
18	1753.70	0	-	0.04	56.0	11.0	0.85	0	758.5	0.01	0.60	20	36
19	1753.74	0	-	0.56	55.5	11.0	2.00	0	759.6	0.53	0.60	20	36
20	1753.81	0	-	0.02	51.5	11.0	0.50	0	760.0	0.03	0.60	0	40
21	1753.84	0	-	0.06	57.5	11.0	0.70	0	758.7	0.03	0.60	15	43
22	1753.83	3	SW	0	59.0	11.0	0.70	0	758.5	0	0.50	15	42
23	1753.78	12	NE	0.06	59.0	11.0	0.65	0	757.8	0.03	0.50	15	43
24	1753.72	11	NE	0.14	59.0	11.0	0.70	0	757.1	0.12	0.50	15	48
25	1753.65	5	NE	0.22	55.0	12.0	0.65	0	758.5	0.11	0.50	25	39
26	1753.57	4	NE	0.31	57.0	11.6	0.40	0	760.2	0.29	0.50	15	37
27	1753.51	8	NE	0	60.5	11.0	0.40	0	760.3	0	0.50	0	33
28	1753.51	4	NE	0.04	62.0	11.0	0.65	0	758.1	0.03	0.50	0	20
29	1753.51	8	NE	0	53.0	12.5	0.70	0	754.9	0	0.50	0	35
30	1753.44	0	-	0	73.0	13.0	0.70	0	754.6	0	0.50	20	45
31	1753.33	2	SE	0.59	63.5	12.0	0.70	0	755.5	0.12	0.40	30	50

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-2 (CONTINUED) MONTH OF SEPTEMBER, 1978.

Date	South Fork Tolt Reservoir								Regulating Basin				
	Elev., ft	Wind Vel., mph	Wind Dir.	Precip., in.	Avg. Air Temp., °F	Water Temp., °C	Max. Turb., NTU	Valve #15, % Open	Elev., ft	Precip., in.	Max. Turb., NTU	Valve #25, % Open	Total Flow, MGD
1	1753.39	4	NW	0.90	57.0	13.0	0.75	0	758.1	0.77	0.40	30	40
2	1754.00	0	-	0.93	56.5	12.5	0.40	0	759.8	0.72	0.40	15	26
3	1754.22	4	NE	0.13	56.5	12.0	0.50	0	760.2	0.07	0.40	0	26
4	1754.42	12	NE	0.28	56.5	12.0	0.70	0	758.1	0.29	0.40	0	24
5	1754.56	4	S	0.50	52.0	12.0	0.70	0	758.9	0.45	0.50	15	27
6	1754.68	2	S	1.36	49.0	12.0	0.07	0	758.7	0.41	0.40	15	28
7	1754.76	0	-	0.13	51.5	12.0	0.70	0	758.3	0.05	0.40	15	34
8	1754.79	8	NE	0.05	50.5	12.0	0.75	0	757.5	0.03	0.40	15	47
9	1754.80	10	NE	0.24	50.5	13.5	0.60	0	758.4	0.23	0.40	25	44
10	1754.83	4	SW	0.75	55.0	12.0	0.60	0	759.4	0.52	0.40	25	50
11	1755.01	0	-	0.59	54.0	13.0	0.80	0	760.1	0.43	0.50	25	42
12	1755.22	2	N	0.06	54.0	13.0	0.75	0	756.6	0.03	0.50	0	45
13	1755.25	0	-	0.01	55.5	13.0	0.75	0	757.1	0.02	0.40	20	43
14	1755.23	3	N	0	51.5	13.0	0.75	0	758.9	0	0.40	20	32
15	1755.24	0	-	1.10	51.5	12.0	0.70	0	760.4	0.95	0.40	20	28
16	1755.39	5	SW	0.10	50.0	12.0	0.95	0	760.1	0.17	0.40	15	40
17	1755.64	0	-	0.66	51.0	12.0	0.85	0	760.3	0.57	0.40	15	28
18	1755.73	2	W	0.21	44.0	12.0	0.75	0	760.1	0.08	0.50	15	26
19	1755.83	8	NE	0	48.0	12.0	0.70	0	760.1	0	0.50	15	31
20	1755.87	10	N	0	50.5	12.0	0.70	0	760.3	0	0.40	15	43
21	1755.98	8	S	0.59	46.0	12.0	0.65	0	757.9	0.27	0.40	0	30
22	1756.18	6	SW	0.67	43.0	12.0	0.70	0	759.2	0.46	0.40	20	31
23	1757.75	8	NE	1.95	51.0	12.0	1.50	0	760.4	1.67	0.40	20	32
24	1757.89	6	NE	0.30	54.0	12.0	0.60	0	760.4	0.19	0.60	20	29
25	1757.56	12	NE	0	59.5	12.0	1.00	0	760.2	0	0.70	20	37
26	1757.23	8	NE	0	65.5	12.0	1.00	0	760.5	0	0.70	35	39
27	1757.00	4	SW	0.20	62.0	12.0	1.00	0	760.5	0.18	0.70	35	38
28	1756.37	9	E	0.08	58.0	12.0	1.00	50	760.3	0.06	0.70	15	31
29	1755.56	5	NE	0.03	54.0	12.0	1.00	50	759.9	0.02	0.60	15	34
30	1754.72	4	S	0.01	62.0	13.0	0.90	50	760.2	0.05	0.60	15	33
31													

Note: All readings were taken by the Seattle Water Department pipeline patrolman and are not official.

APPENDIX B-3

SUMMARY OF INFORMATION ON GRANULAR MEDIA FILTERS

Pages 45 through 48 contain information supplied by the manufacturers on the granular media filters. The graphs on pages 49 through 56 present filter efficiency information for various medias as a function of filter loading rate.

THE Turbitrol® COMPANY
A DIVISION OF THE TAULMAN COMPANY

Uniform Dual Media
TEST FILTER BED RECOMMENDATION

415 E. Paces Ferry Road N.E. P. O. Box 12047 Atlanta, Georgia 30305 404 262-3491

FOR: Greg Kirmeyer
Seattle Water Department
1509 South Spokane Street
Seattle, Washington 98144

SHIPPED TO: John Marshall
Seattle Water Department
2700 Airport Way South
Seattle, Washington

The following recommendations are made with the best information available at the time. Specific applications may result in various solids loading and filtration characteristics which may necessitate a change in filter bed. For this reason, we request the individual responsible for conducting filtration tests provide periodic data to The Turbitrol Company for complete evaluation. Based on subsequent test analysis and results Turbitrol engineers may recommend changes in filter media bed design or gradation.

Based on the information supplied to Turbitrol the intended filter bed will be utilized for the following test filter description:

Surface area .11 sq. ft.
Depth top of filter bottom to backwash overflow ____ ft. ____ in.
Filter Bottom ____

Avg. rate of flow 4 GPM/ft²
Max rate of flow 6 GPM/ft²
Allowable headloss 8 ft.

Application: Asbestos Removal

The following loadings are expected:

Turbidity 71 NTU
Suspended Solids ____ mg/l
BOD ____ mg/l

Particle Size ____ microns
Phosphate ____ mg/l
Other ____

The following effluent quality is desired: .1 to .06

Based upon previous experience in this application or similar applications, the following media bed is recommended for initial testing:

Turbitrol UDM Bed	9545			
Turbikol No.	9500	x	20	Inches
Turbisand No.	4500	x	10	Inches
Support Gravel	-	x		Inches
Support Gravel	-	x		Inches
Support Gravel	-	x		Inches
Support Gravel	-	x		Inches
Support Gravel	-	x		Inches

Our recommended backwash rate for the above bed is 17.5 GPM/ft2 at 23°.

If any questions arise, do not hesitate to contact The Turbitrol Company for information.

SM 1603-1

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THE Turbitrol® COMPANY
A DIVISION OF THE TAILMAN COMPANY

Uniform Dual Media SCREEN ANALYSIS

415 E Paces Ferry Road N E P O Box 12047 Atlanta Georgia 30355 404/262-3491

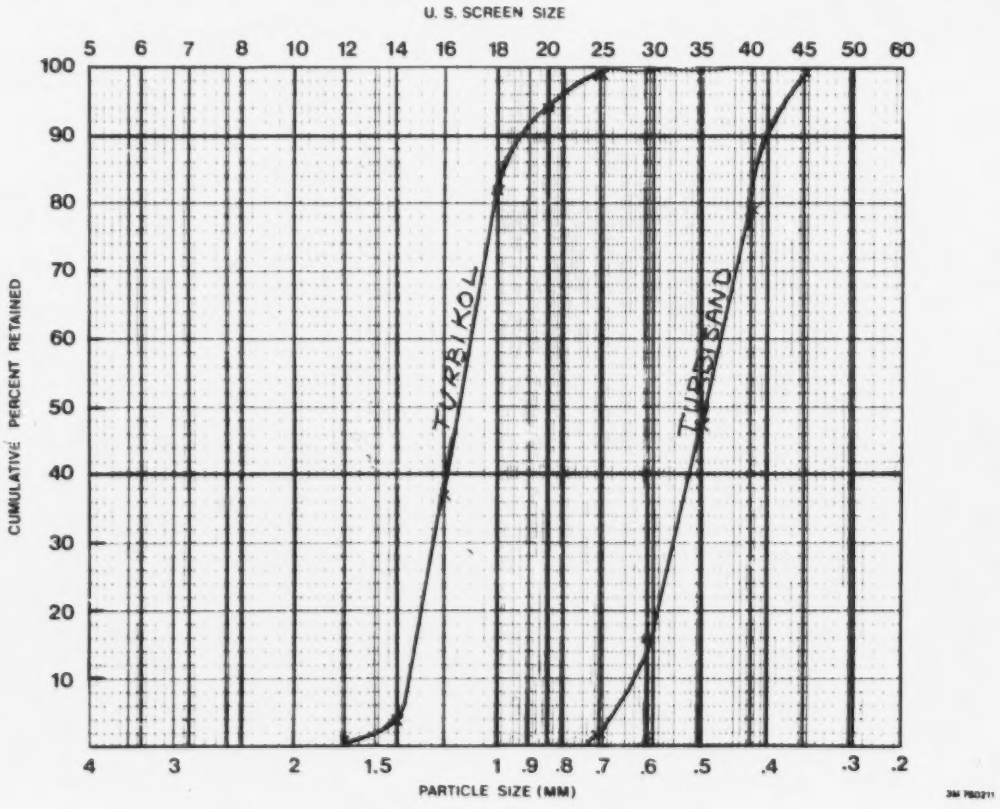
FINE COAL

Sample of TURBITROL 9545 UDM
TR-15 & TR17
Location SEATTLE WATER DEPT
Test Performed By
Date

ANALYSIS

SAMPLE 1	SAMPLE 2
% GREATER THAN ____ mm	% GREATER THAN ____ mm
% LESS THAN ____ mm	% LESS THAN ____ mm
EFFECTIVE SIZE .92 mm	EFFECTIVE SIZE .40 mm
UNIFORMITY COEFFICIENT 1.28	UNIFORMITY COEFFICIENT 1.30

			SAMPLE 1 TURBIKOL			SAMPLE 2 TURBISAND		
TYLER EQUIV	OPG MM	U.S. NO.	SAMPLE WEIGHT	PERCENT	PERCENT CUMULATIVE WEIGHT	SAMPLE WEIGHT	PERCENT	PERCENT CUMULATIVE WEIGHT
4	4.760	4						
5	4.000	5						
6	3.360	6						
7	2.830	7						
8	2.380	8						
9	2.000	10						
10	1.680	12			1			
12	1.410	14			4			
14	1.190	16			37			
16	1.000	18			87			
20	840	20			96			
24	710	25			100			2
28	590	30						16
32	500	35						47
35	420	40						79
42	350	45						100
48	297	50						
60	250	60						
TOTAL								



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THE Turbitrol® COMPANY
A DIVISION OF THE TAULMAN COMPANY

Uniform Dual Media SCREEN ANALYSIS

415 E. Paces Ferry Road N.E. P. O. Box 12047 Atlanta, Georgia 30355 404 262-3491

CORRSE COAL

Sample of TURBIKOL 1100 UDM

Location SEATTLE WASH.

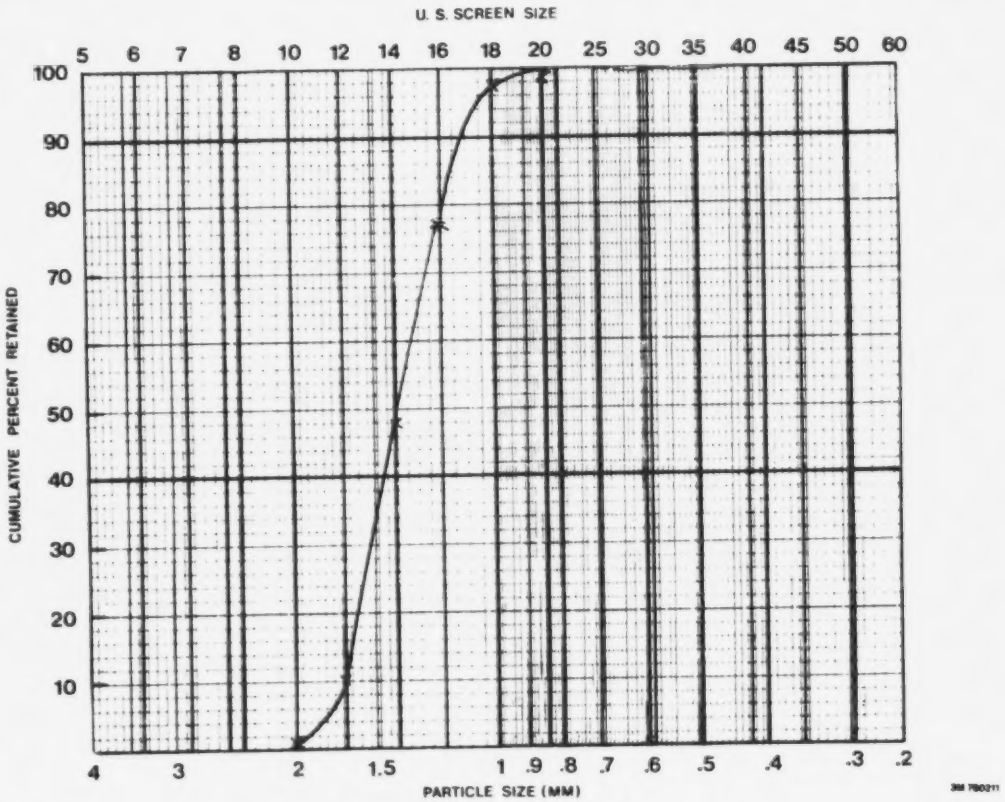
Test Performed By

Date 12-29-77

ANALYSIS

SAMPLE 1	SAMPLE 2
10 % GREATER THAN 1.68 mm	% GREATER THAN mm
13 % LESS THAN 1.12 mm	% LESS THAN mm
EFFECTIVE SIZE 1.1 mm	EFFECTIVE SIZE mm
UNIFORMITY COEFFICIENT 1.31	UNIFORMITY COEFFICIENT

			SAMPLE 1 TURBIKOL			SAMPLE 2		
TYLER EQUIV	OPG MM	U.S. NO.	SAMPLE WEIGHT	PERCENT	PERCENT CUMULATIVE WEIGHT	SAMPLE WEIGHT	PERCENT	PERCENT CUMULATIVE WEIGHT
4	4.760	4						
5	4.000	5						
6	3.360	6						
7	2.830	7						
8	2.380	8						
9	2.000	10			1			
10	1.680	12			10			
12	1.410	14			48			
14	1.190	16			73			
16	1.000	18			93			
20	.840	20			99			
24	.710	25			100			
28	.590	30						
32	.500	35						
35	.420	40						
42	.350	45						
48	.297	50						
60	.250	60						
	TOTAL							



MIXED MEDIA INFORMATION

FURNISHED BY NEPTUNE-MICROFLOC

Coal MS-4

Specific Gravity:	Not less than 1.55
Uniformity Coefficient	< 1.7
Effective Size	1.0 - 1.1

Sand	MS-6	MS-18
Specific Gravity:	2.6 $\pm$ 0.05	2.6 $\pm$ 0.05
Uniformity Coefficient	< 1.8	1.4
Effective Size	0.42 - 0.55	0.42 - 0.52

Garnet MS-21

Specific Gravity:	Not less than 3.8
Effective Size	0.18 - 0.32

Support High Density Media MS-22

Specific Gravity:	Not less than 3.8
Effective Size	1.4 - 2.5

COLUMN MM

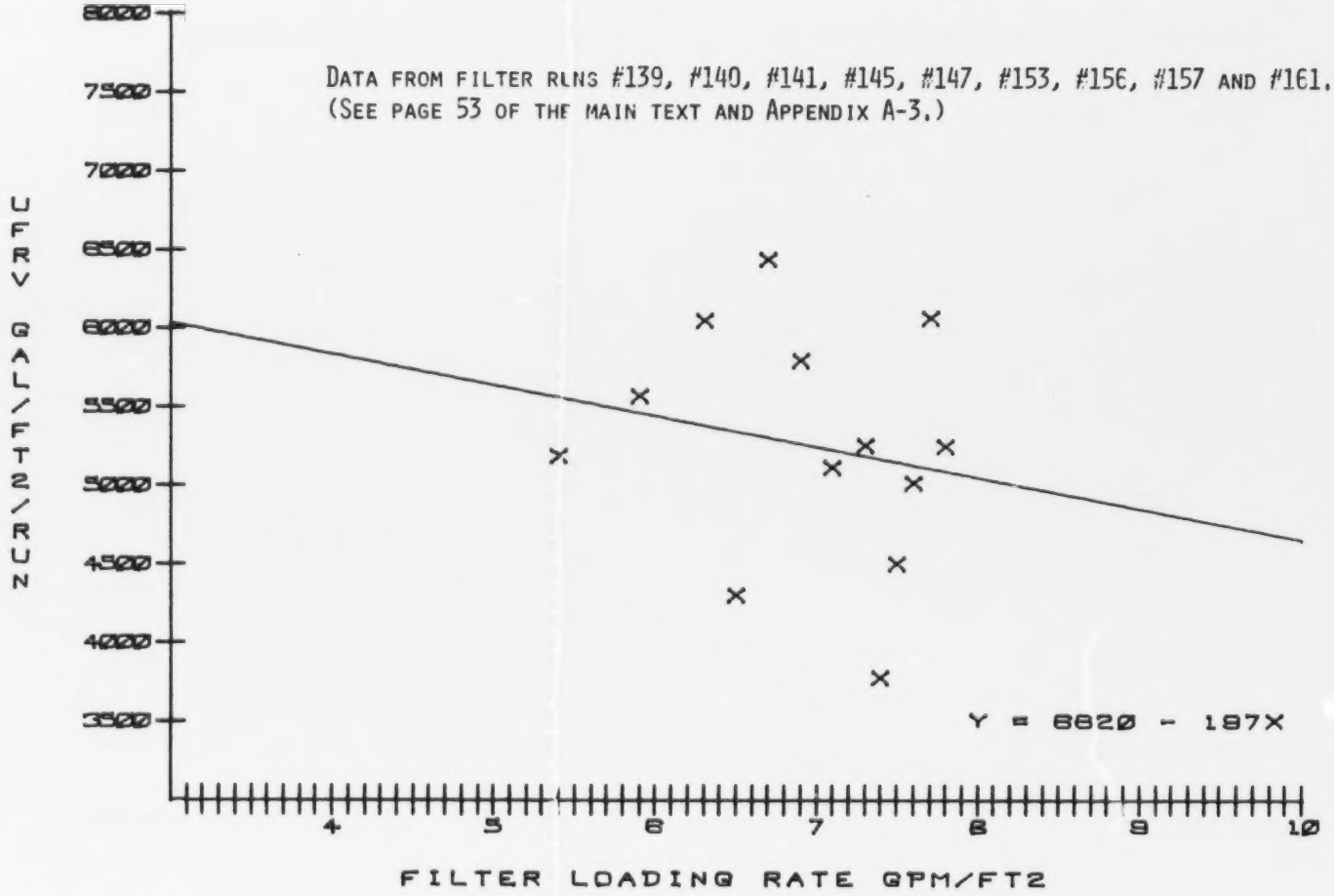


FIGURE B3-1. UFRV VS. FILTER LOADING RATE - COLUMN MM.

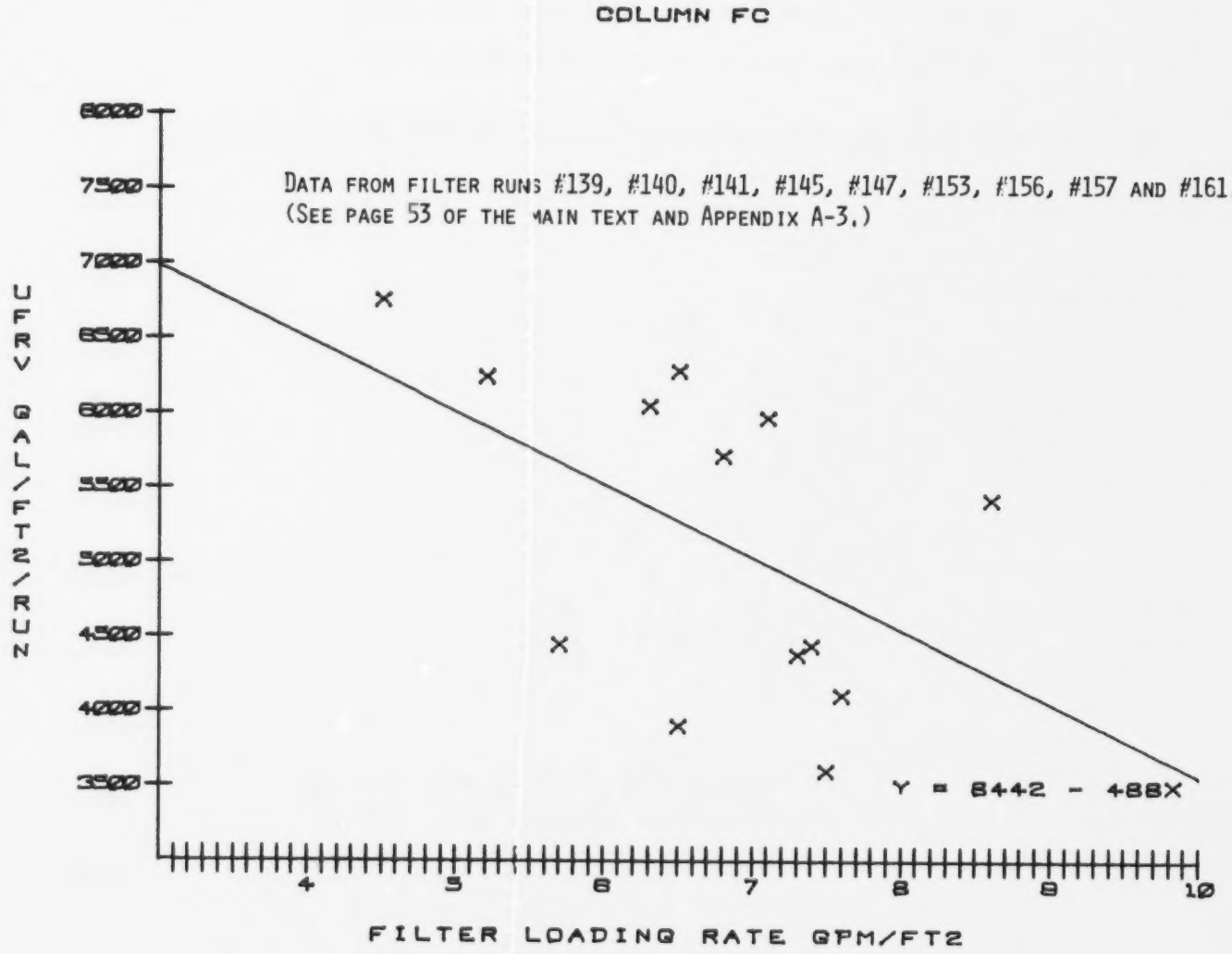


FIGURE B3-2. UFRV VS. FILTER LOADING RATE - COLUMN FC.

COLUMN CC

DATA FROM FILTER RUNS #139, #140, #141, #145, #147, #153, #156, #157 AND #161.
(SEE PAGE 53 OF THE MAIN TEXT AND APPENDIX A-3.)

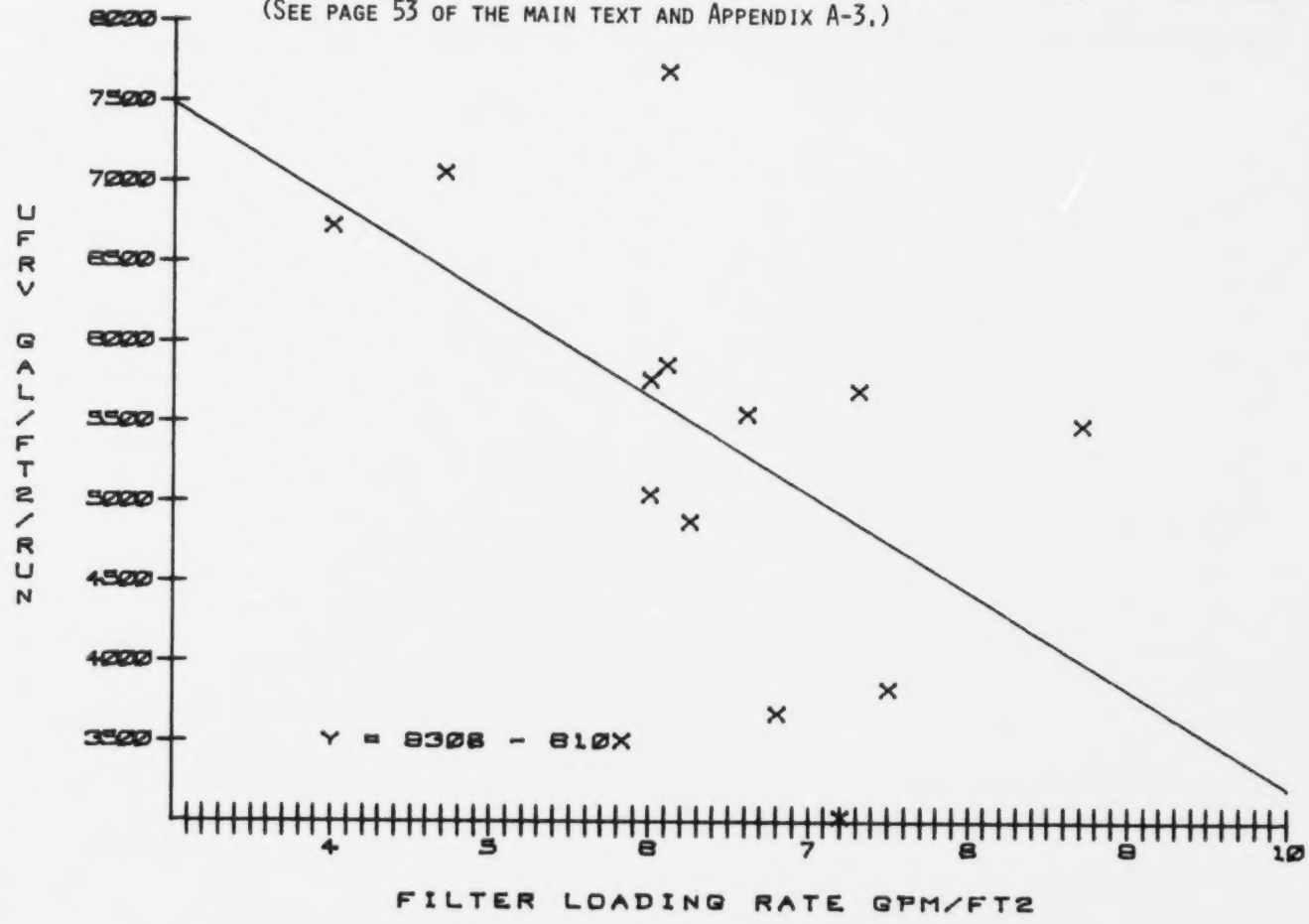


FIGURE B3-3. UFRV VS. FILTER LOADING RATE - COLUMN CC.

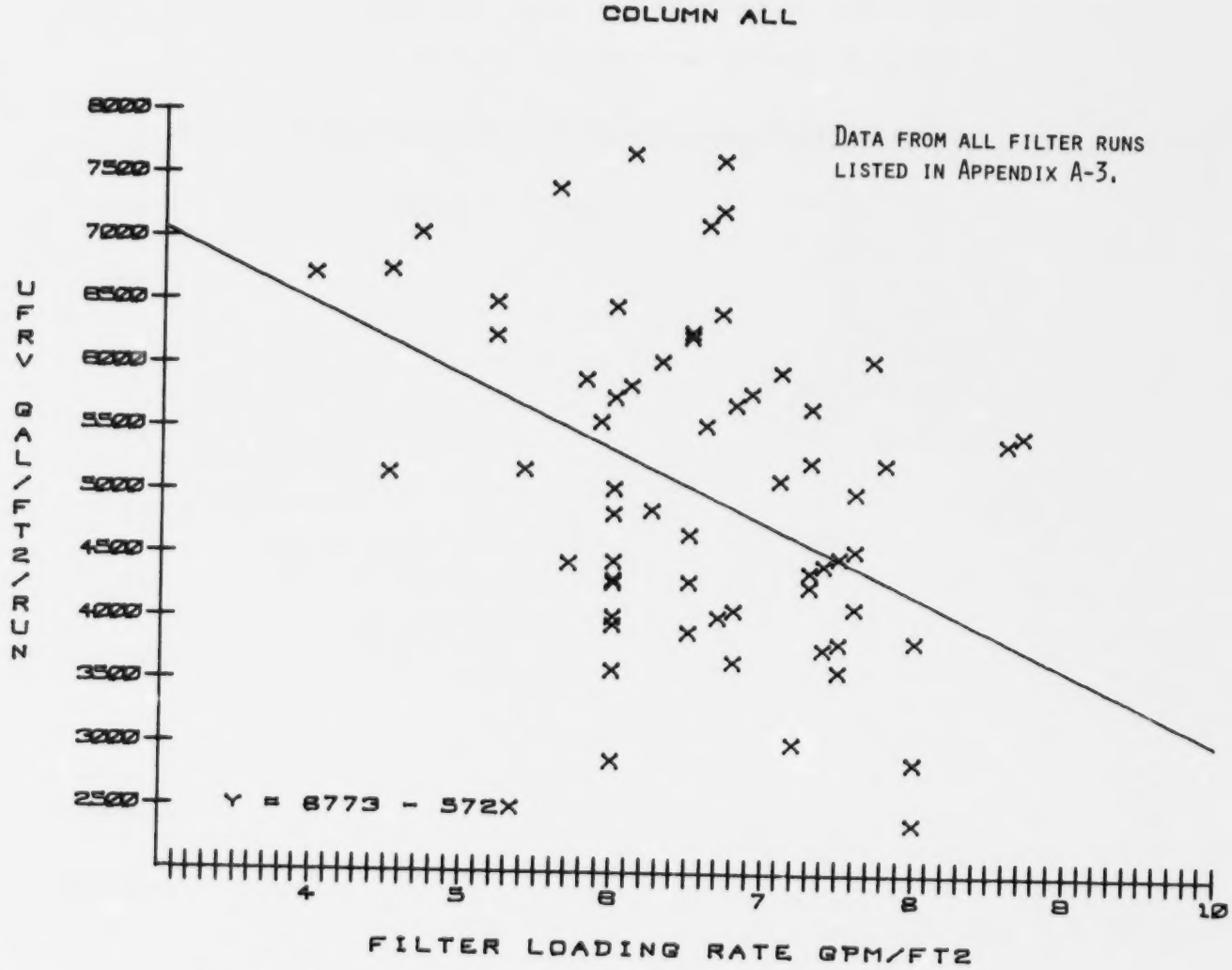


FIGURE B3-4. UFRV VS. FILTER LOADING RATE - ALL COLUMNS COMBINED.

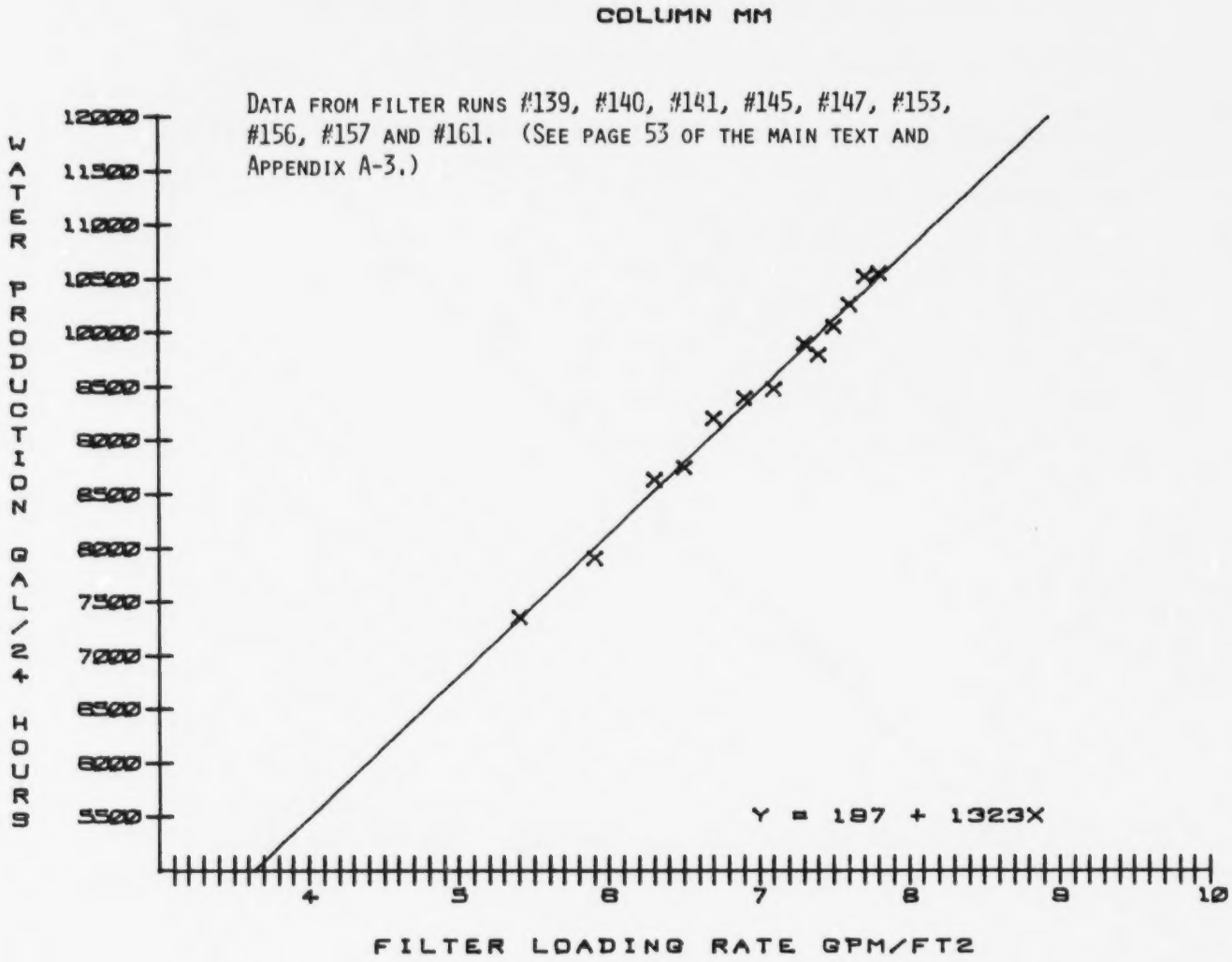


FIGURE B3-5. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN MM.

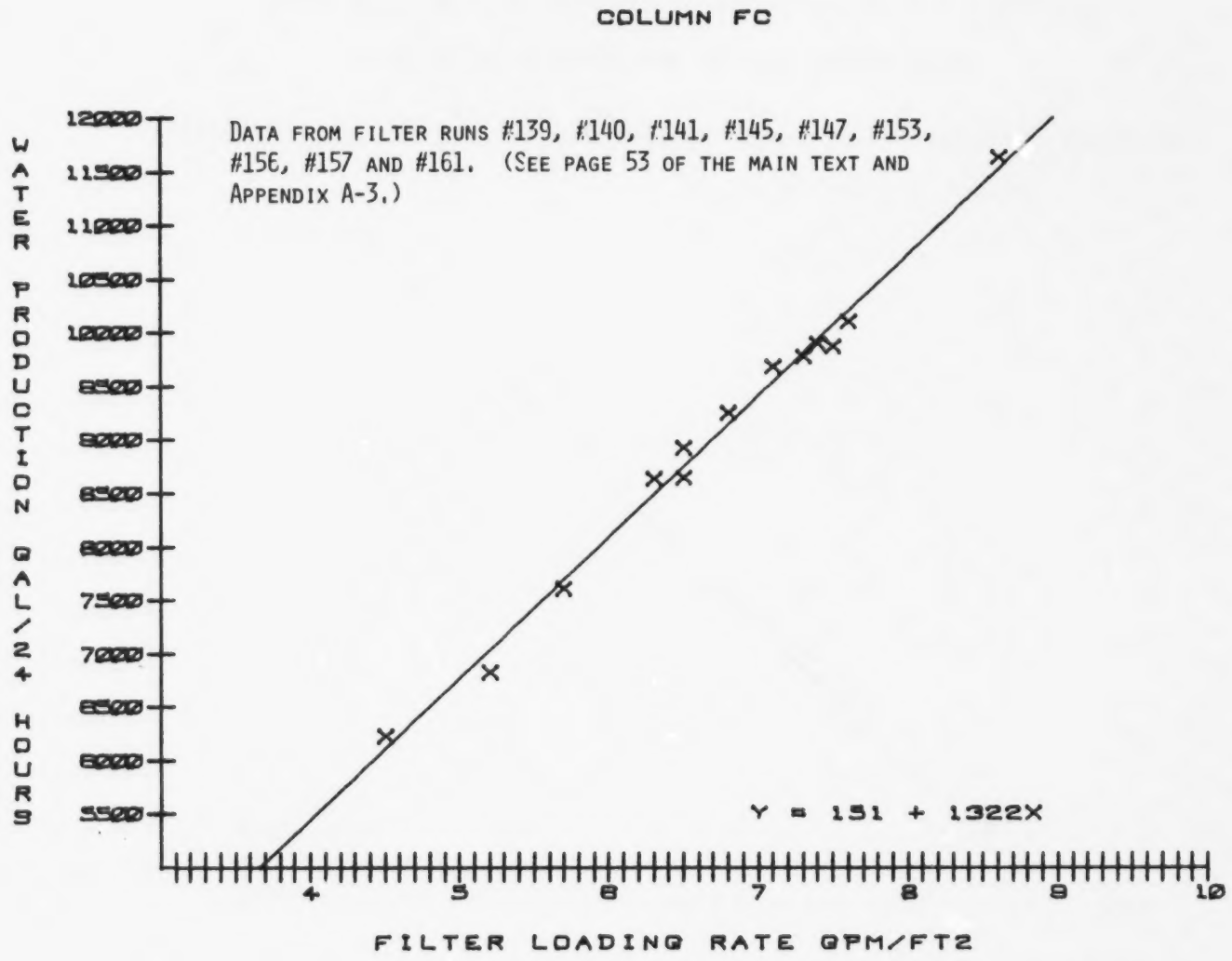


FIGURE B3-6. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN FC.

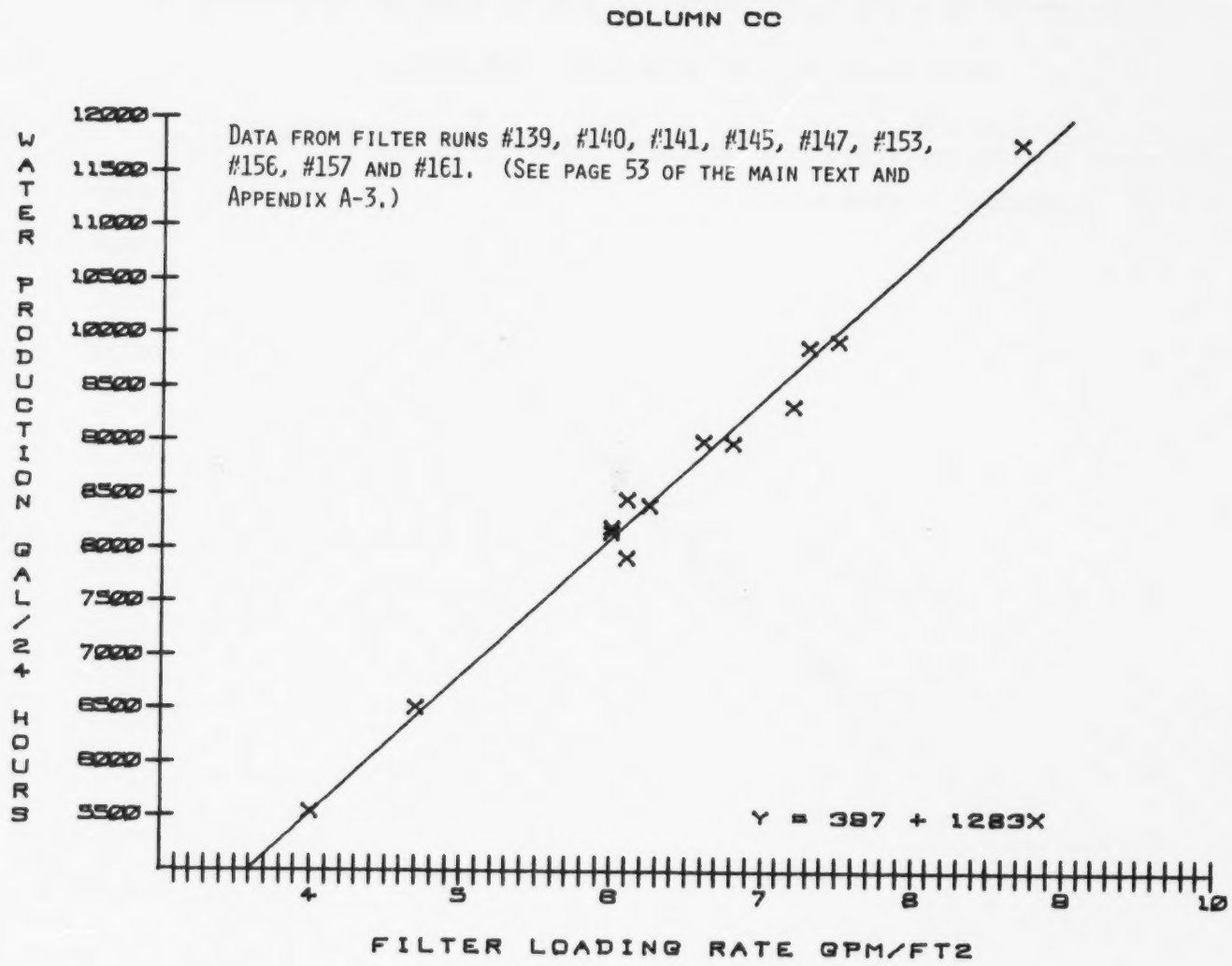


FIGURE B3-7. NET WATER PRODUCED VS. FILTER LOADING RATE - COLUMN CC.

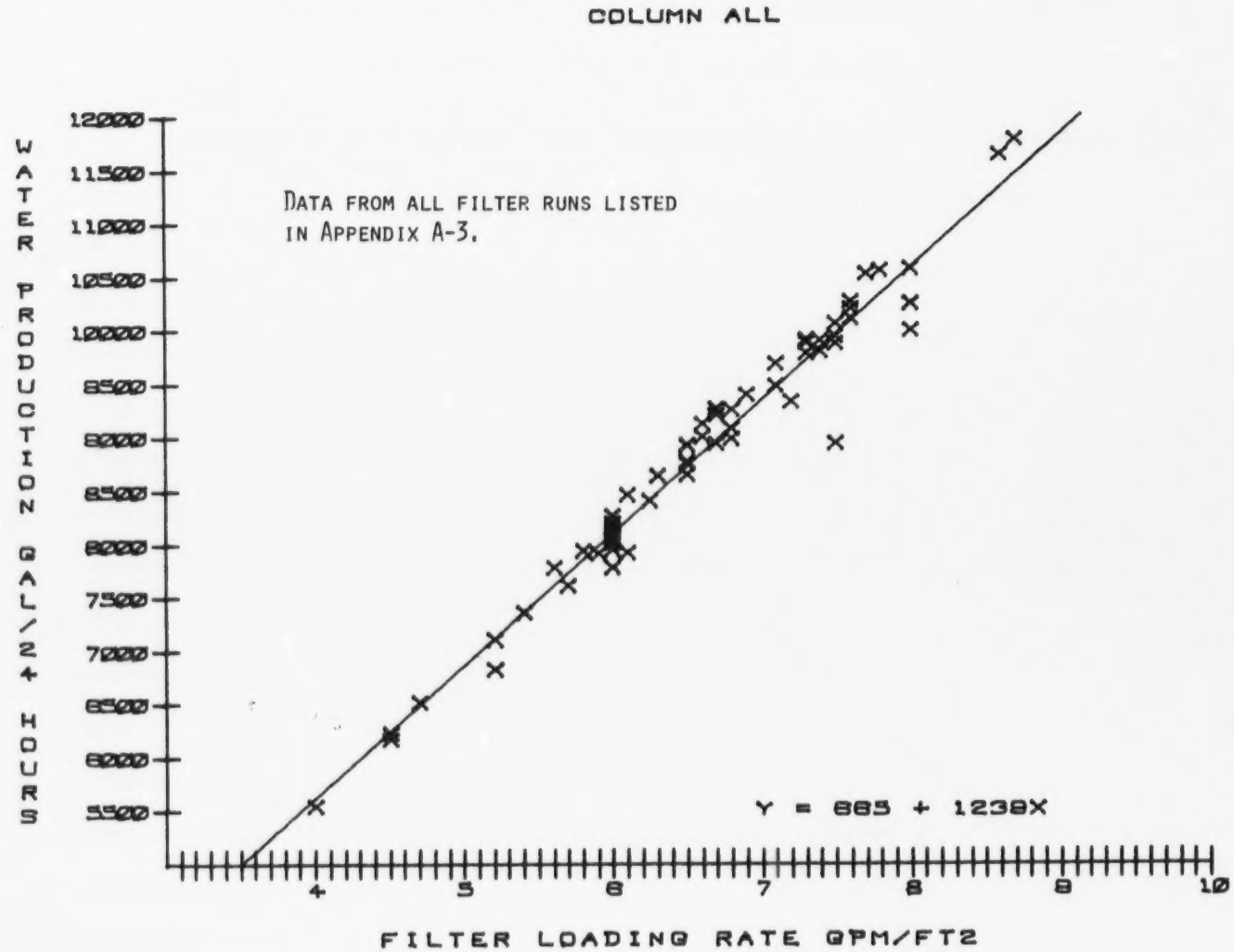


FIGURE B3-8. NET WATER PRODUCED VS. FILTER LOADING RATE - ALL COLUMNS COMBINED.

APPENDIX B-4

MICROGRAPHS OF ASBESTOS FIBERS

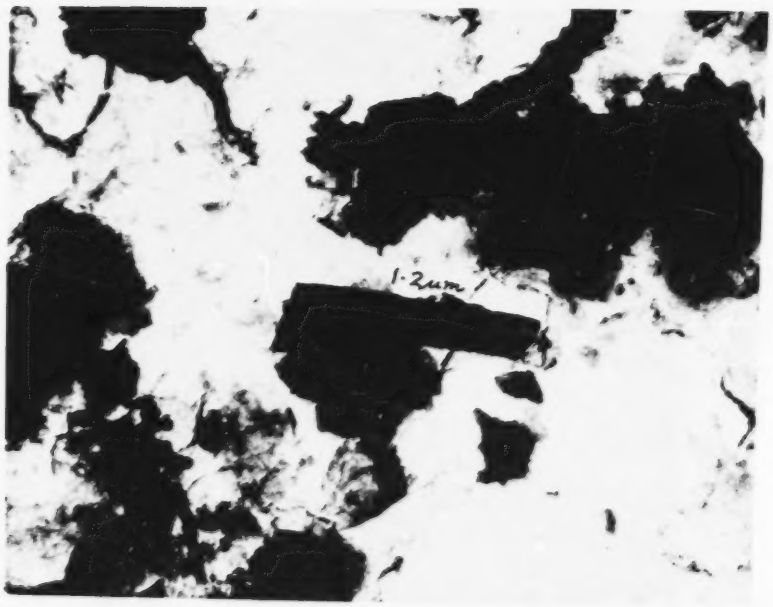


Figure B4-1. Amphibole fiber in raw water.

(magnification 31,500x)

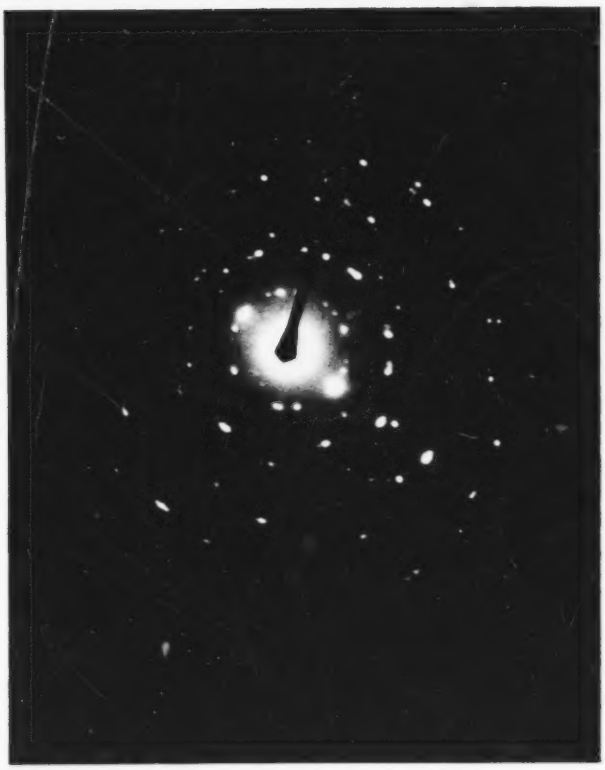


Figure B4-2. Electron diffraction dot pattern.

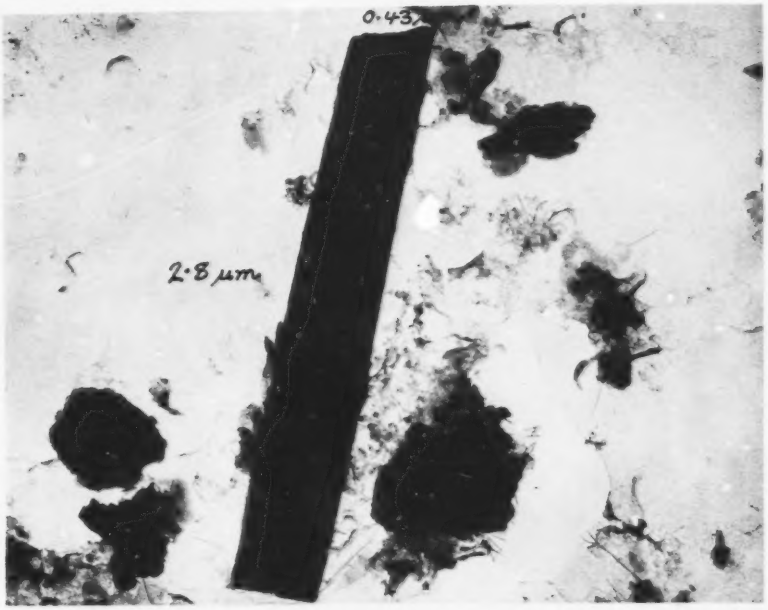


Figure B4-3. Amphibole fiber in raw water.
(magnification 30,450x)

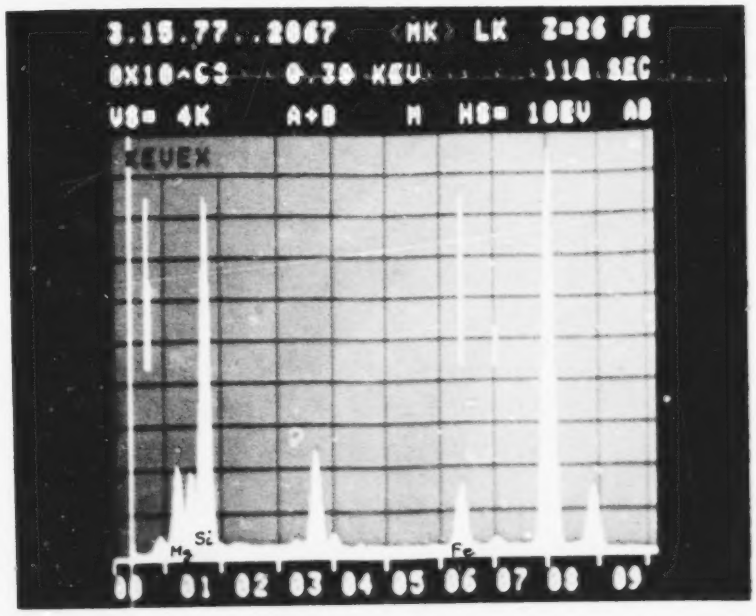


Figure B4-4. X-ray analysis of anthophyllite fiber.

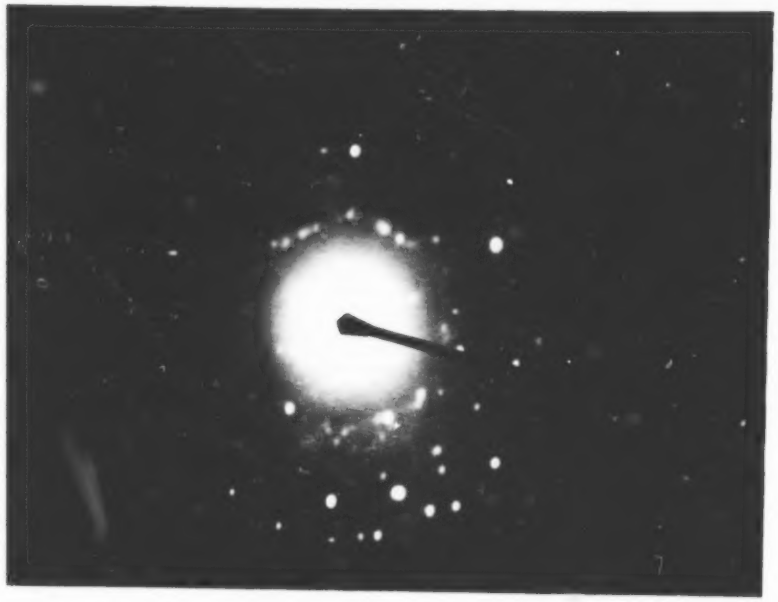


Figure B4-5. Electron diffraction dot pattern for chrysotile fiber.

Figure B4-6. Two chrysotile fibers and a possible amphibole.

(magnification 31,500x)

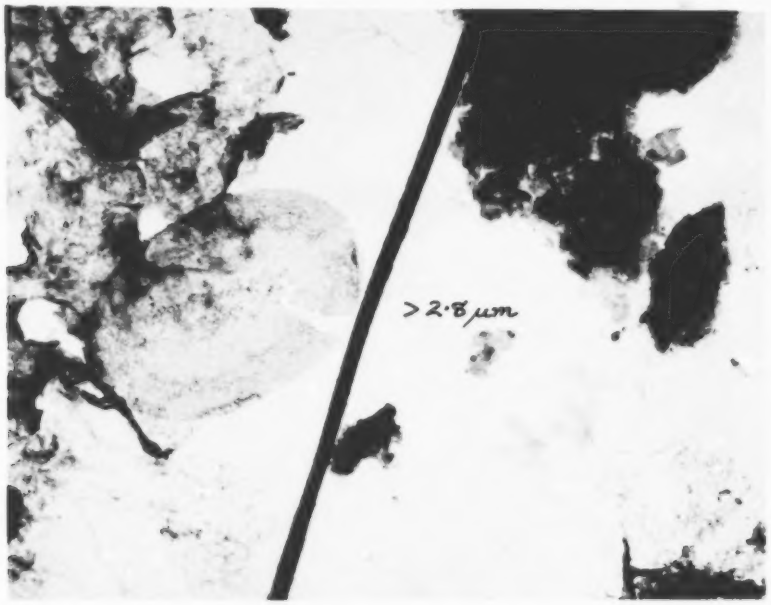


Figure B4-7. Chrysotile fiber in raw water.
(magnification 34,000x)

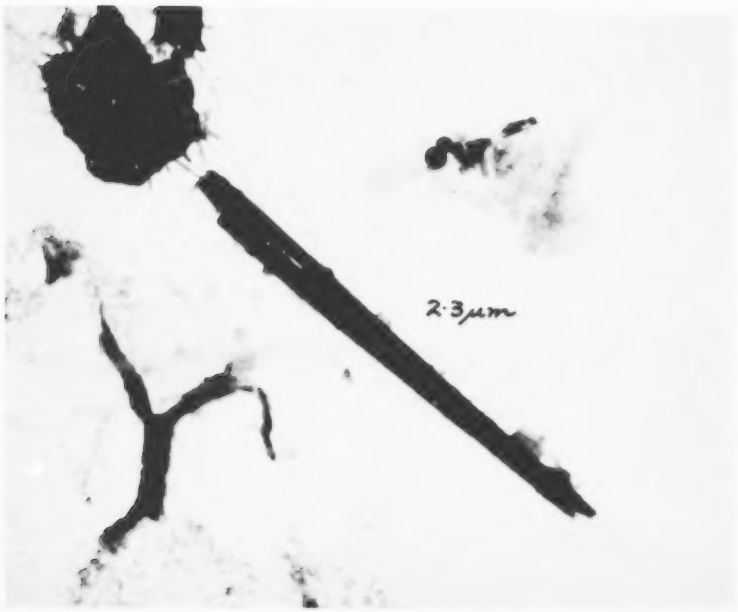


Figure B4-8. Bundle of chrysotile fibers in raw water.
(magnification 34,000x)

Figure B4-9. Amphibole fiber in raw water.
(magnification 28,350x)

Figure B4-10. Chrysotile fiber in raw water.
(magnification 28,350x)

Figure B4-11. Bundle of chrysotile fibers in finished water.
(magnification 28,300x)

APPENDIX B-5

PARTICLE COUNT DATA

Run #3

Raw Water Turbidity = 1.4
Raw Water Particle Count = 4575

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
6	0.10	43		
8	0.10	146	$0.04(10^6)$	$0.09(10^6)$
10	0.4	2126		
12	2.0	11077		
14	2.5	13432		

Run #4c

Raw Water Turbidity = 1.4
Raw Water Particle Count = 2926

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.5	39		
1	0.13	186		
2	0.10	11		
3	0.10	7		
4	0.10	21		
5	0.10	15	$0.05(10^6)$	$0.09(10^6)$
6	0.10	11		
7	0.10	21		
8	0.10	33		
9	0.10	949		
10	0.10	39		
11	0.10	32		
12	0.60	232		

Run #5c

Raw Water Turbidity = 1.4
Raw Water Particle Count = 1262

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.25	3078		
1	0.12	27		
2	0.08	24		
3	0.07	23		
4	0.06	26		
5	0.08	51	$<0.01(10^6)$	$0.15(10^6)$
6	0.08	312		
7	0.08	65		
8	0.08	30		
9	0.08	17		
10	0.08	11		
11	0.35	414		
12	0.45	692		

Run #6d

Raw Water Turbidity = 1.25
Raw Water Particle Count = 2441

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.95	218		
1	0.08	72		
2	0.08	32		
3	0.07	42		
4	0.07	34	$0.05(10^6)$	$0.15(10^6)$
5	0.07	79		
6	0.06	30		
7	0.06	801		
8	0.07	147		
9	0.07	26		
10	0.15	80		
11	0.10	150		
12	0.10	252		
13	0.13	39		

Run #11

Raw Water Turbidity = 1.15
Raw Water Particle Count = 2438

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	1.6	271		
1	0.83	128		
2	0.45	44		
3	0.33	30		
4	0.31	36		
5	0.28	18		
6	0.28	73	$0.42(10^6)$	$1.64(10^6)$
7	0.26	21		
8	0.26	21		
9	0.24	101		
10	0.20	260		
11	0.18	16		
12	0.24	48		
13	0.24	23		
14	0.24	16		
15	0.24	48		
16	0.19	83		
17	0.18	100		

Run #12d

Raw Water Turbidity = 1.0
Raw Water Particle Count = 177

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.95	40		
1	0.10	20		
2	0.098	9.7		
3	0.095	11		
4	0.095	23		
5	0.094	29		
6	0.09	6		
7	0.09	20	$0.01(10^6)$	$0.13(10^6)$
8	0.08	14		
9	0.08	40		
10	0.08	160		
11	0.08	15		
12	0.08	40		
13	0.08	22		
14	0.08	43		
15	0.08	46		
16	0.08	21		
17	0.08	382		
18	0.08	53		
19	0.09	196		
20	0.09	366		
21	0.11	331		

Run #21

Raw Water Turbidity = 0.70
Raw Water Particle Count = 216

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.13	10		
1	0.072	10		
2	0.065	16	$0.01(10^6)$	$0.16(10^6)$
3	0.060	38		
4	0.059	15		
5	0.059	75		
6	0.060	4	$0.01(10^6)$	$0.16(10^6)$
7	0.34	22	$0.72(10^6)$	$12.25(10^6)$
8	0.060	7	$<0.01(10^6)$	$0.19(10^6)$
9	0.065	16		
10	0.063	31		
11	0.070	33		
12	0.059	8	$<0.01(10^6)$	$0.09(10^6)$
13	0.062	17		

Run #24

Raw Water Turbidity = 0.60
Raw Water Particle Count = 107

Hour Into Run	Finished Water		Amphibole	Chrysotile
	Turbidity (NTU)	Particle Count (#/ml)	fibers/liter	fibers/liter
0	0.098	10		
1	0.071	11		
2	0.065	9		
3	0.065	10		
4	0.071	4		
5	0.070	4		
6	0.085	18	$0.04(10^6)$	$0.34(10^6)$
7	0.36	35	$0.6\ (10^6)$	$6.2\ (10^6)$
8	0.41	40		
9	0.08	26		
10	0.072	20		
11	0.062	15		
12	0.060	21		
13	0.062	18	$0.04(10^6)$	$0.13(10^6)$
14	0.058	16		
15	0.060	22		
16	0.091	36		
17	0.059	21		
18	0.059	12		
19	0.059	10		
20	0.06	40		

APPENDIX B-6

FILTER RUN PILOT TESTING AT HIGH RAW WATER TURBIDITIES

I. SUMMARY

Pilot tests were conducted to determine if direct filtration techniques could effectively treat water with abnormally high raw water turbidities. These tests indicated that such techniques could produce an acceptable quality finished water when raw water turbidity was less than approximately 20 NTU.

II. INTRODUCTION

Purpose

The purposes of this phase of the asbestos removal study were to determine (1) if the process flow schematic consisting of a static mixer, a flocculation chamber and a granular media filter could effectively remove abnormally high raw water turbidities; (2) what practical upper limit of raw water turbidity could be removed; and (3) which of the test medias was most effective under the stressed conditions.

Goals

To effectively remove asbestos particles from the raw water, the filtration process had to remove turbidity down to levels which were $\leq$ 0.1 NTU. Since turbid water conditions are normally short term phenomena resulting from landslides or flooding, the turbidity goal in the finished water was changed. Rather than attempting to produce a finished water turbidity of $\leq$ 0.1 NTU, the desired goal was increased to 0.5 NTU, which is still well below the maximum contaminant level of 1.0 NTU set forth by the National Interim Primary Drinking Water Regulations. This less stringent goal was justifiable during emergencies since it would be more important to produce a safe water by today's standards rather than removing all asbestos particles from the water.

Methods and Equipment

To achieve the high turbidities, soil from the banks of the South Fork Tolt Reservoir was gathered and mixed with raw Tolt water. The slurry was allowed to settle to remove heavy suspended material and the supernatant was decanted into another container for feeding into the pilot plant. Equipment limitations prohibited the investigator from injecting the slurry at a point upstream of the static mixer and consequently it was fed directly into the head end of the flocculation chamber. Raw water turbidities between 5 and 34 NTU were achieved using these methods.

III. RESULTS

General

Data from filter runs conducted at the abnormally high raw water turbidities is presented in Table B6-1 and plots of headloss and turbidity vs. time are contained in Figures B6-1 through B6-21.

Water Quality

The data indicate that direct filtration techniques using a static mixer, a flocculation chamber and a granular media filter can significantly reduce excessive turbidity present in the raw water. Using 10 mg/l of alum, lime for pH control and a nonionic polymer as a filter aid, direct filtration methods reduced raw water turbidities of 20 NTU down to $\leq$ 0.5 NTU. Raw water turbidities $>$20 NTU could be reduced but finished waters exceeded 0.5 NTU after filtration. It is likely that chemical feed rates could be adjusted to effectively remove raw water turbidities that are $>$20 NTU but such an evaluation was beyond the scope of this study.

Water Production

Most of the filter runs were conducted at a moderate filter loading rate of about 4 gpm/ft^2. Normally, as the raw water turbidities increased, both the length of the filter run and the filter efficiency decreased. Utilizing direct filtration techniques at these high raw water turbidities was not expected to be a very efficient method of operation but the tests demonstrated that an acceptable quality finished water could be produced for short periods of time at moderate loading rates. The coarse coal dual media generally produced more water per filter run than either dual media with fine coal or the mixed media filter.

IV. CONCLUSIONS

Treatment techniques similar to those which remove asbestos fibers from Tolt water can be used to reduce abnormally high raw water turbidities (20 NTU) down to $\leq$ 0.5 NTU in the finished water. Direct filtration techniques are inefficient under such raw water conditions but can produce potable water for a short period of time until the turbidity recedes. Dual media with coarse coal was the most effective filter media.

TABLE B6-1. DETAILED DATA ON FILTER RUNS AT HIGH RAW WATER TURBIDITIES

Run No.	Plant Flow gpm	Filter Loading gpm/ft^2	Finished Water			Net Water Produced gal/ft^2/24 hrs	Raw Water Turbidity NTU	Temp. ^{o}C	Process	pH	
			# of Hours ≤0.5 NTU	# of Hours 8' to 10'	UFRV gal/ft^2/run						
150	16.00	4.00	7	7	1680	4869	4.0 - 13		Raw RM Floc Finished	7.2 7.0 7.0 7.0	7.2 7.6 7.0 7.0
151	8.8	2.20	8	8	924	2469	5.0	8.5	Raw RM Floc Finished	6.5 6.6 6.4 6.5	
151MM	0.43	3.94	7	12	1655	4785	5.0	SAME	AS RUN #151---		
151FC	0.46	4.15	7	10	1743	5077	5.0	SAME	AS RUN #151---		
151CC	0.45	4.07	10	10	2442	5234	5.0	SAME	AS RUN #151---		
154	16.00	4.00	10	10	2400	5136	6.0	9.0	Raw RM Floc Finished	6.5 6.6 6.6 6.6	
154MM	0.44	4.00	10	15	2400	5136	6.0	9.0	SAME AS RUN #154		
154FC	0.43	3.92	10	12	2352	5024	6.0	SAME	AS RUN #154---		
154CC	0.44	3.96	12	13	2851	5184	6.0	SAME	AS RUN #154---		
159	16.00	4.00	8	8	1920	4980	5.0	10.5	Raw RM Floc Finished	6.5 6.6 6.6 6.6	
160	16.00	4.00	7	7	1680	4869	14 - 34	13	Raw RM Floc Finished	6.6 6.6 6.6 6.8	

(continued)

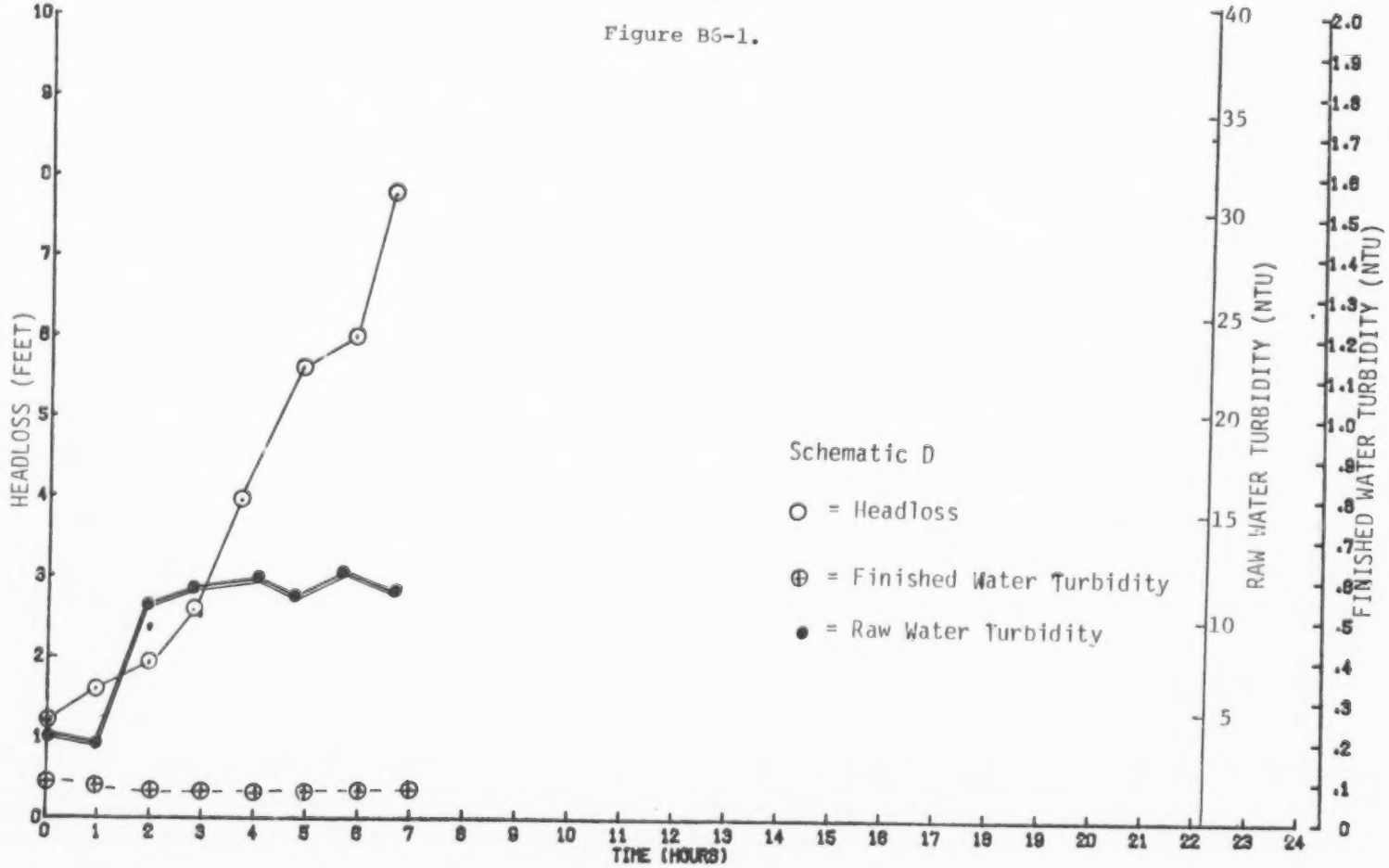
TABLE B6-1 (CONTINUED)

Run No.	Plant Flow gpm	Filter Loading gpm/ft^2	Finished Water: # of Hours ≤0.5 NTU	Finished Water: # of Hours 8' to 10'	Finished Water: UFRV gal/ft^2/run	Net Water Produced gal/ft^2/24 hrs	Raw Water Turbidity NTU	Temp. °C	Process	pH
160MM	0.43	3.89	9	10	2101	4913	SAME AS RUN #160----------			
160FC	0.43	3.92	9	10	2117	4955	SAME AS RUN #160----------			
160CC	0.43	3.88	9	10	2095	4899	SAME AS RUN #160----------			
162	16.00	4.00	0	2	0	0	5 - 34	13	RAW RM FLOC FINISHED	6.6 6.6 6.8 6.6
162MM	Avg.= 0.53 Max.= 0.56	4.83	1	4	290	416	18 - 34	SAME	AS RUN #162----	
162FC	Avg.= 0.53 Max.= 0.56	4.16	0	2		0	18 - 34	SAME	AS RUN #162----	
162CC	Avg.= 0.44 Max.= 0.56	3.99	3	5	718	3667	18 - 34	SAME	AS RUN #162----	
163	16.00	4.00	1	2	240	0	18 - 34	13.1	RAW RM FLOC FINISHED	6.7 6.8 6.6 6.7
163MM	Avg.= 0.48 Max.= 0.56	4.33	4	4	1039	4646	SAME AS RUN #163----------			
163FC	Avg.= 0.38 Max.= 0.56	3.43	3	3	617	2928	SAME AS RUN #163----------			
163CC	Avg.= 0.56 Max.= 0.45	4.13	5	5	1239	4690	SAME AS RUN #163----------			

HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 150

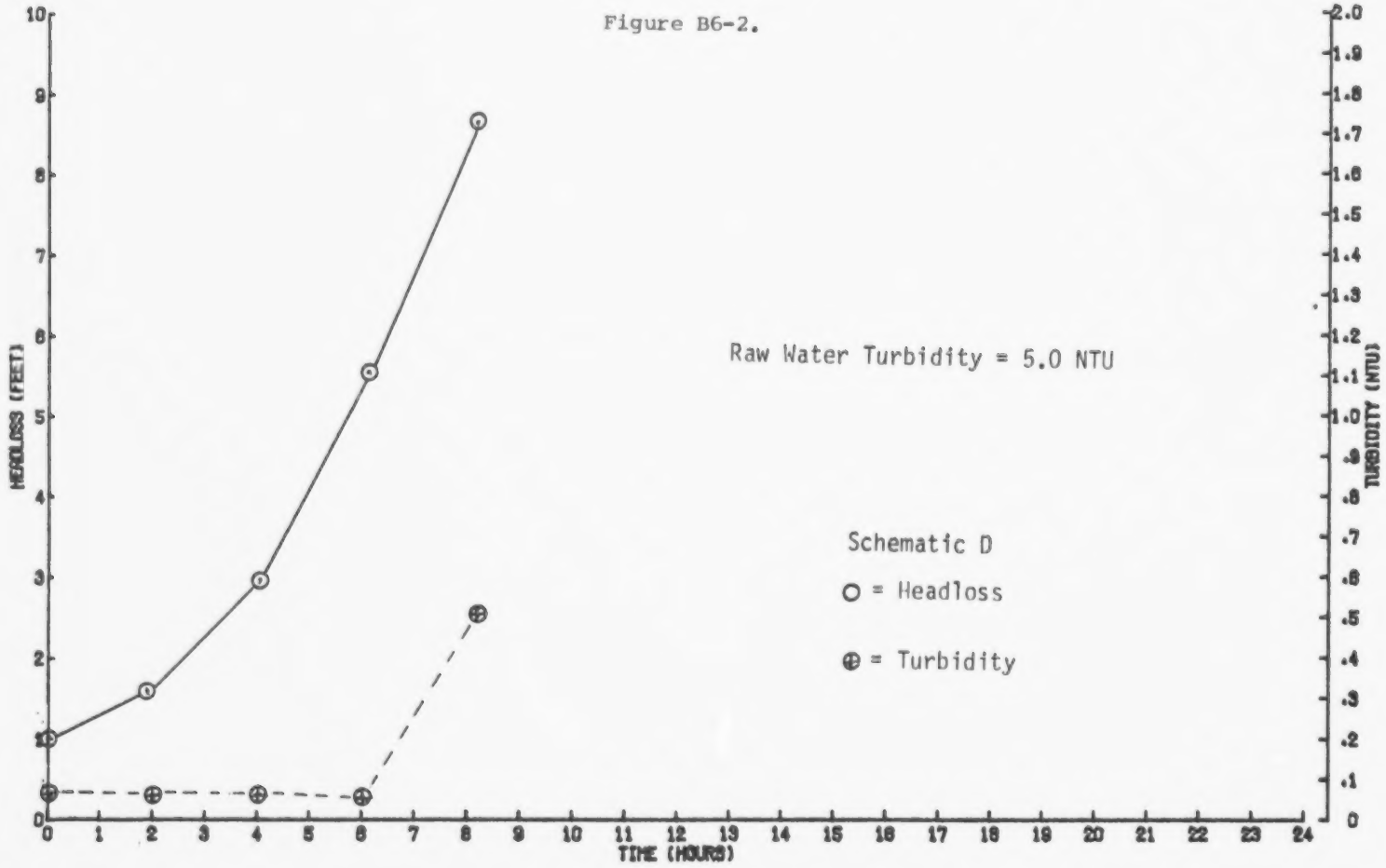
Figure B6-1.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151

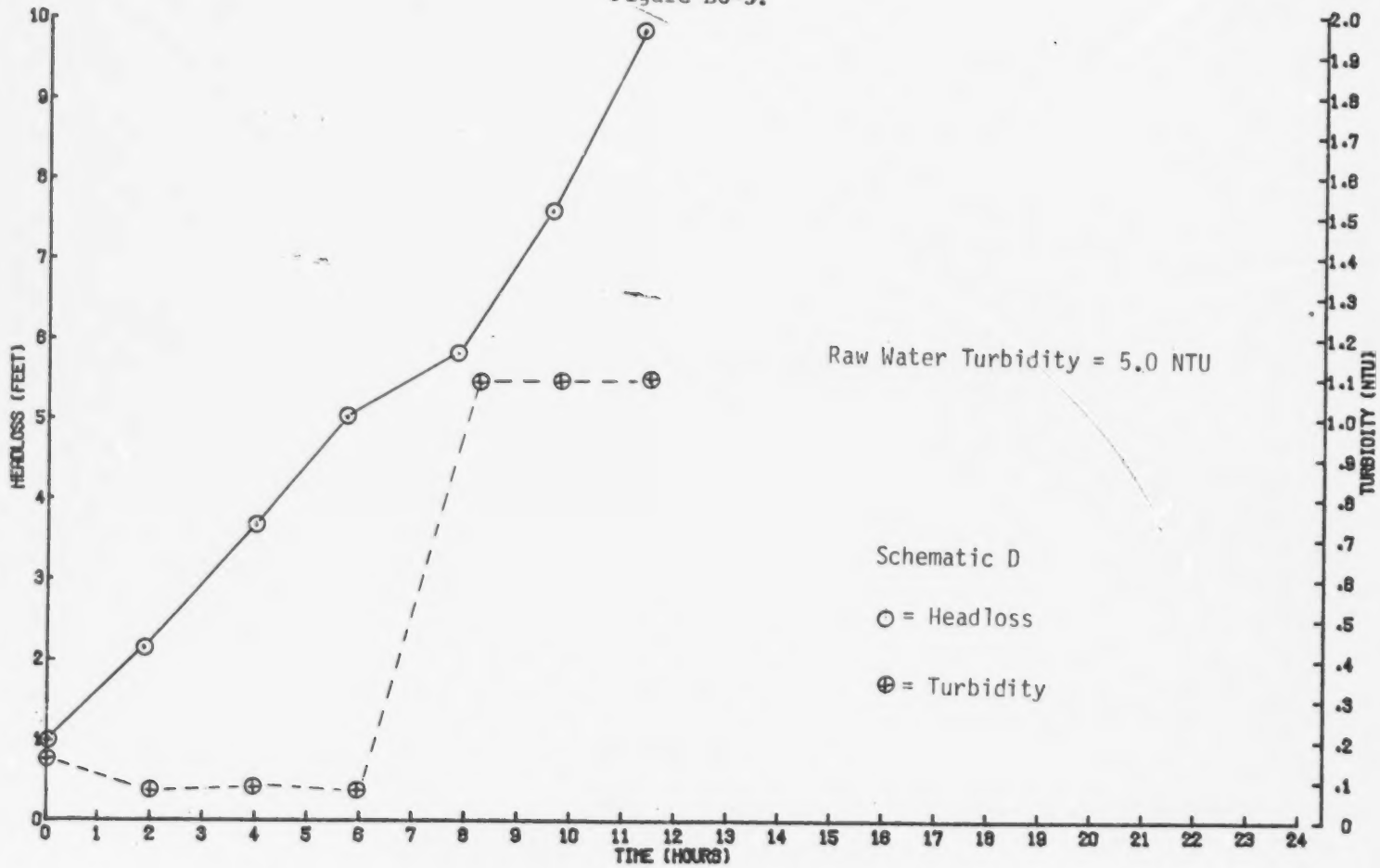
Figure B6-2.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151MM

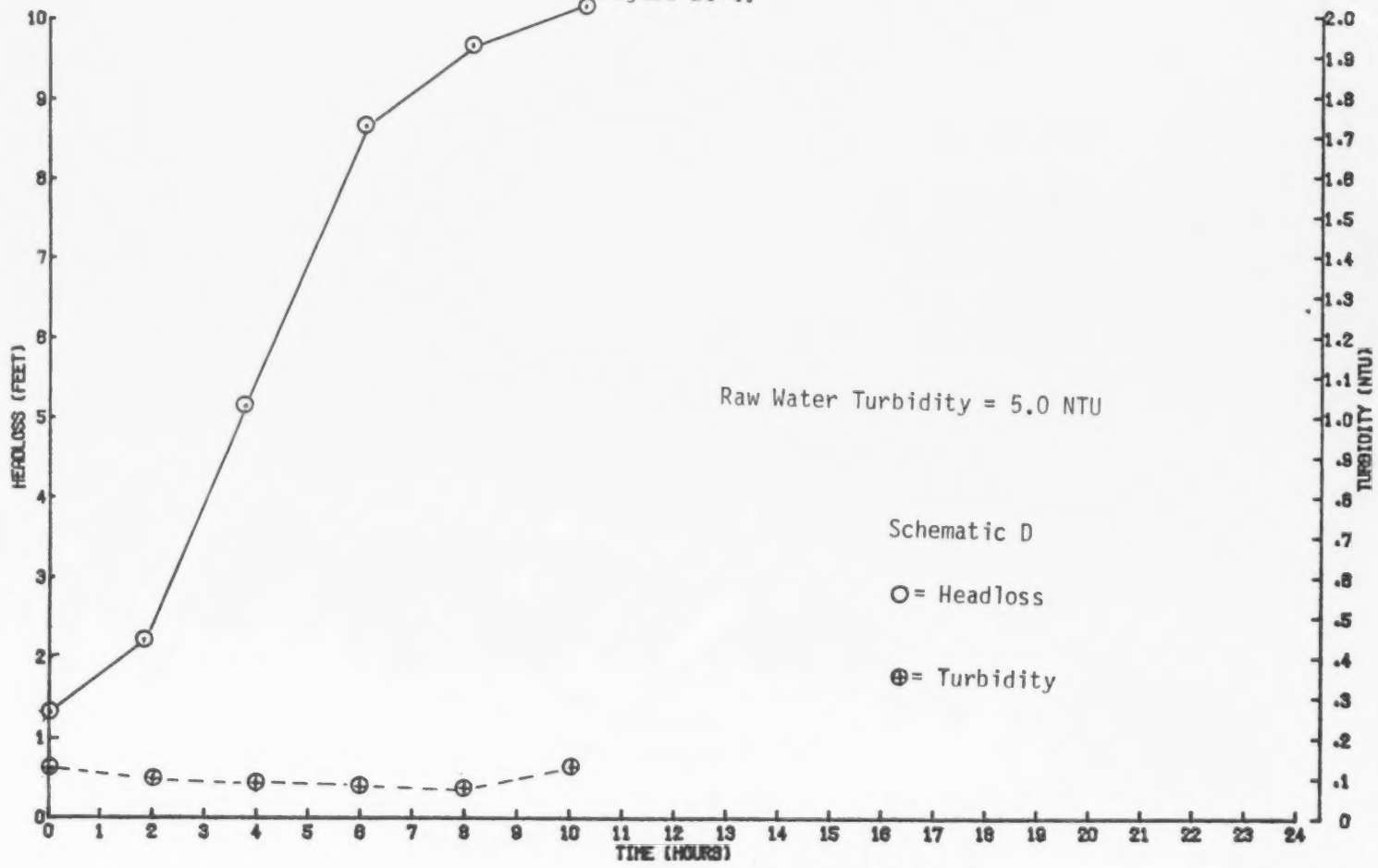
Figure B6-3.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151FC

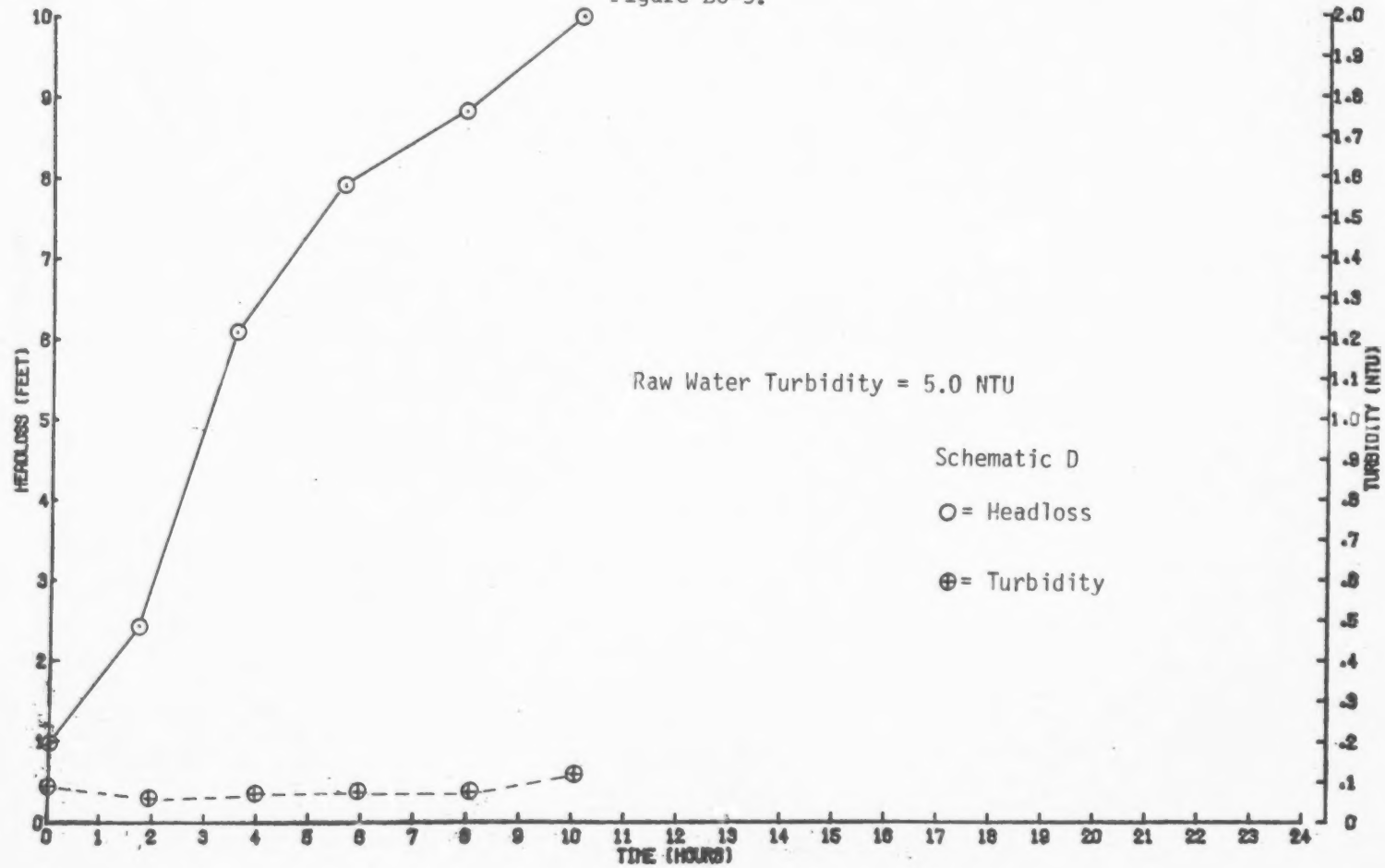
Figure B6-4.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 151CC

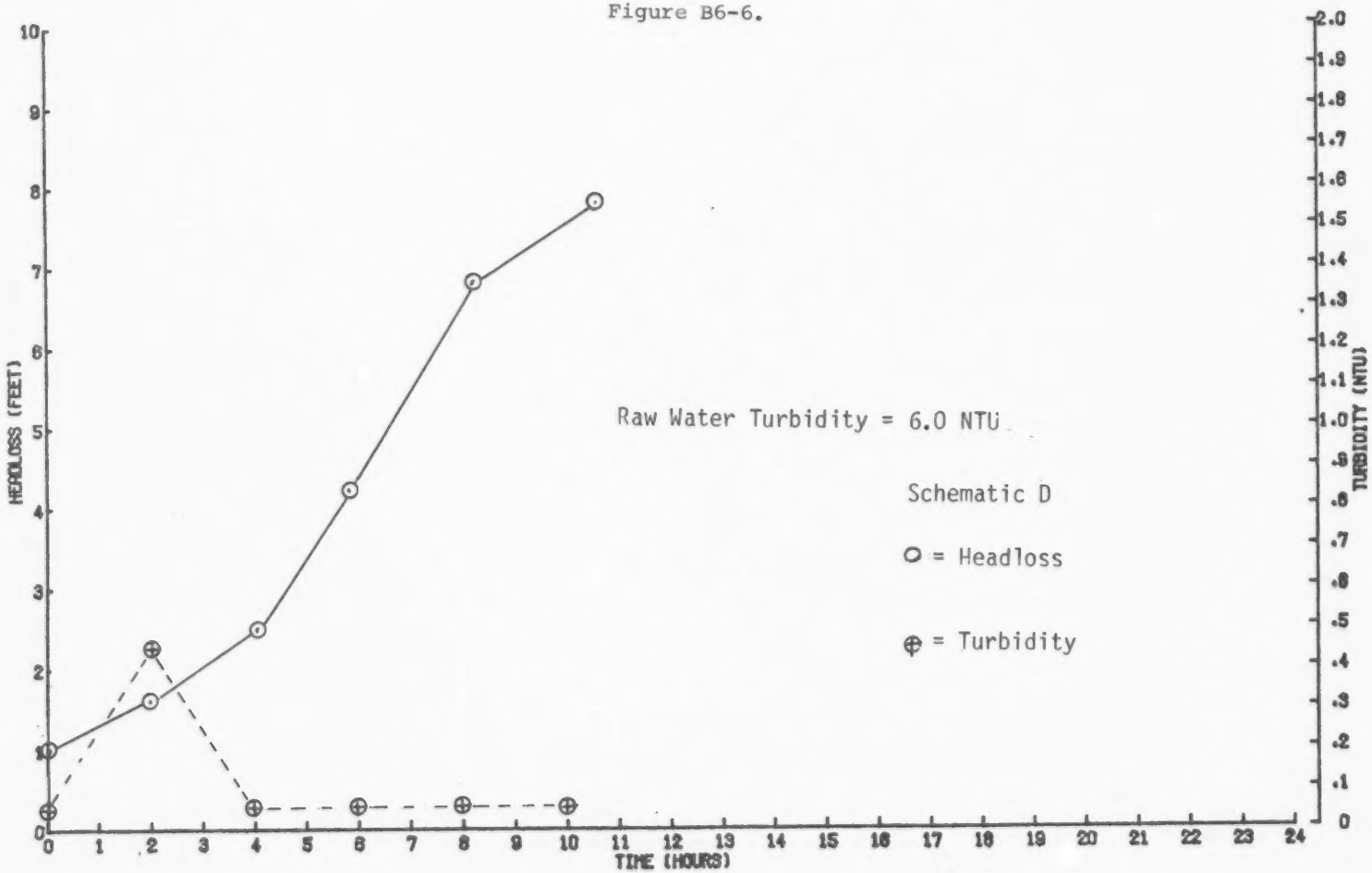
Figure B6-5.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154

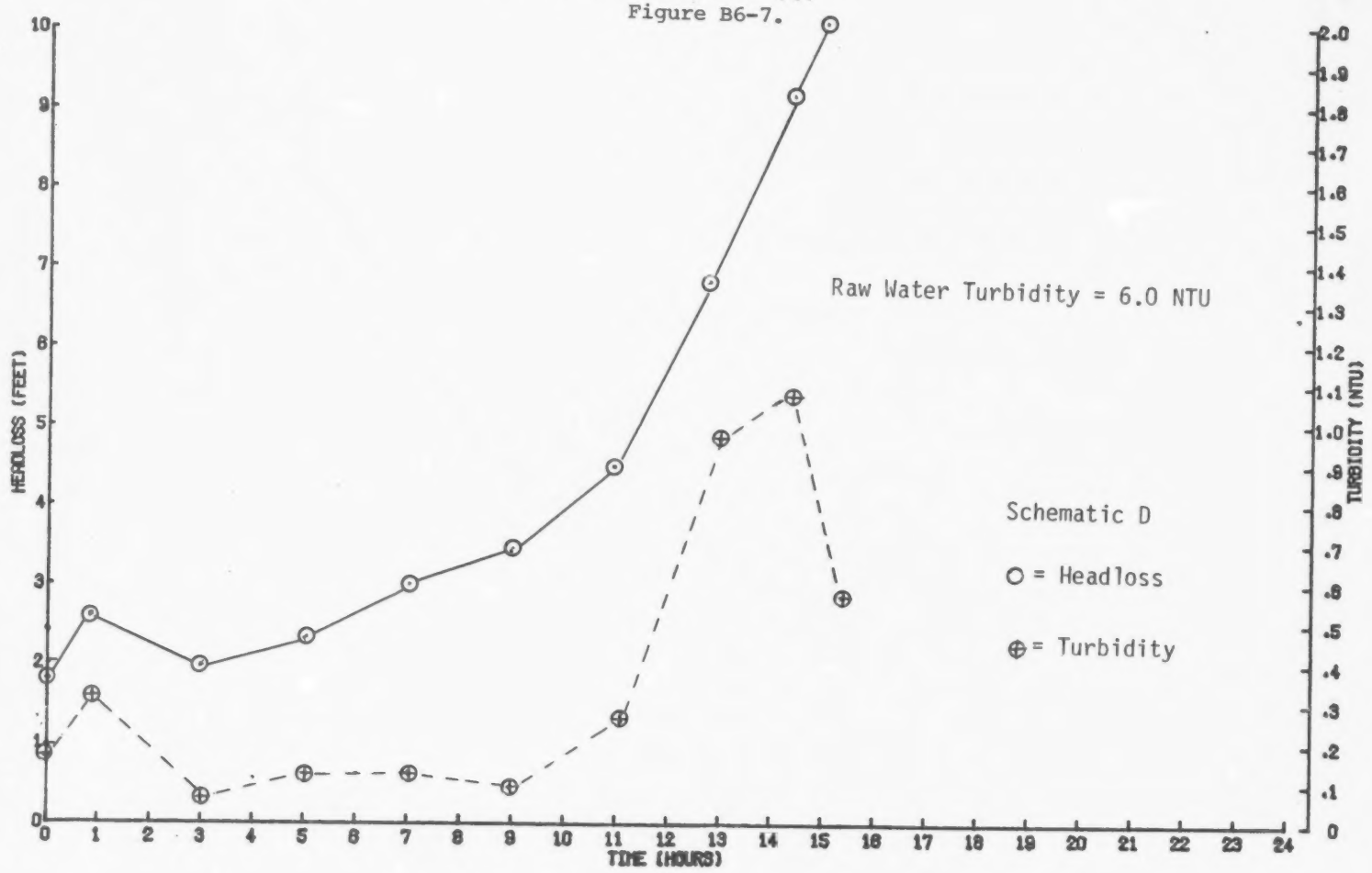
Figure B6-6.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154MM

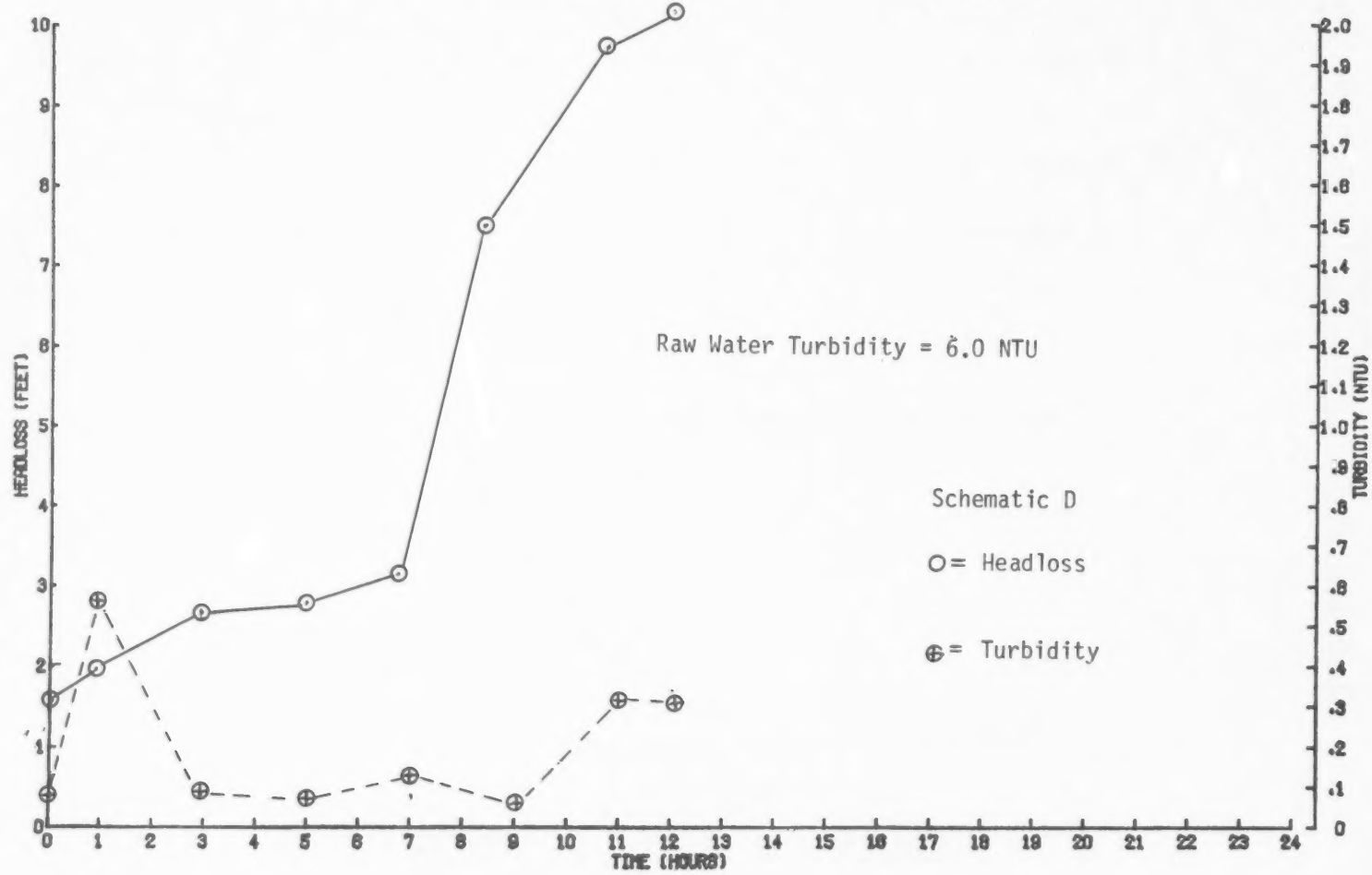
Figure B6-7.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154FC

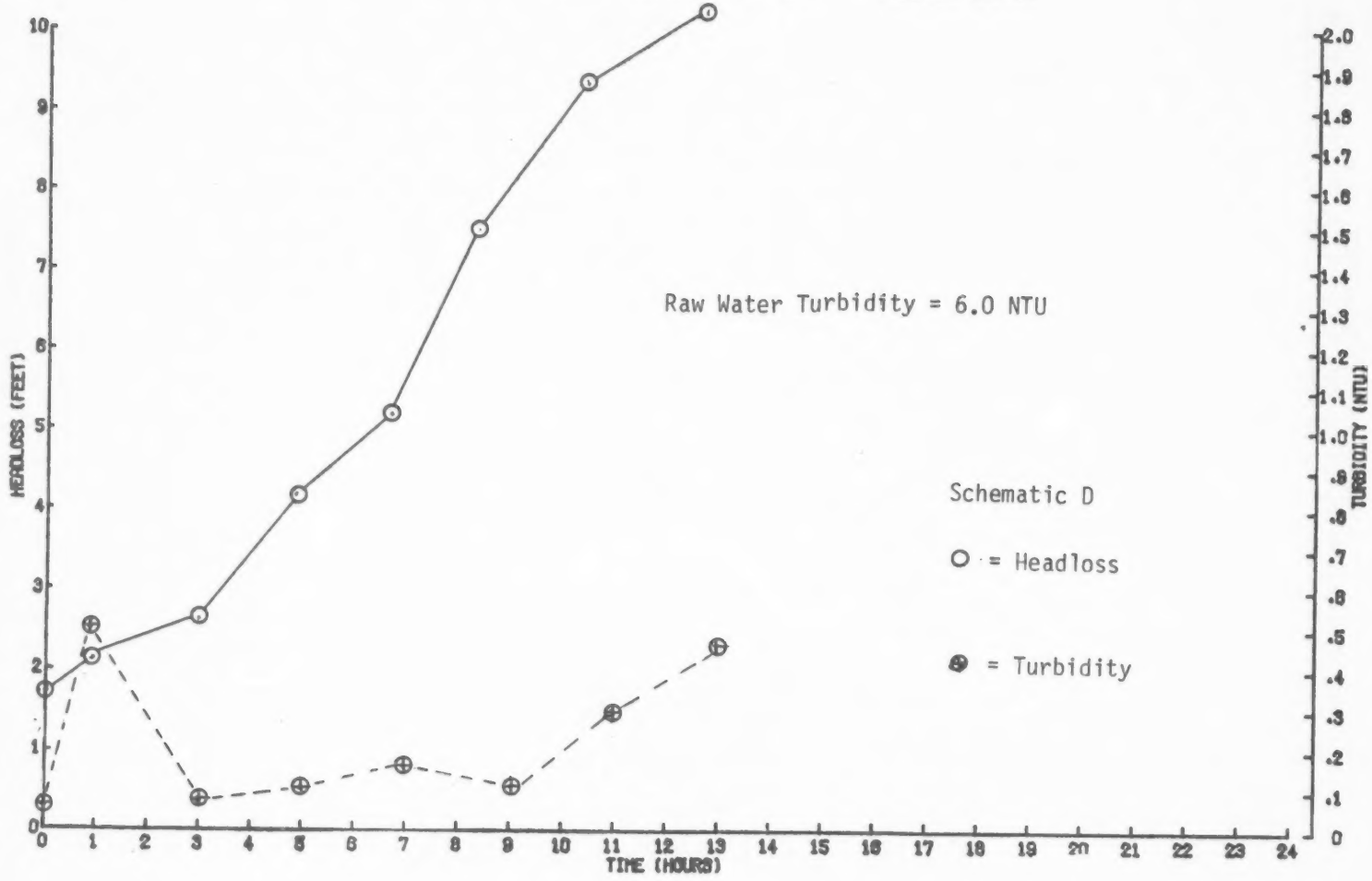
Figure B6-8.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 154CC

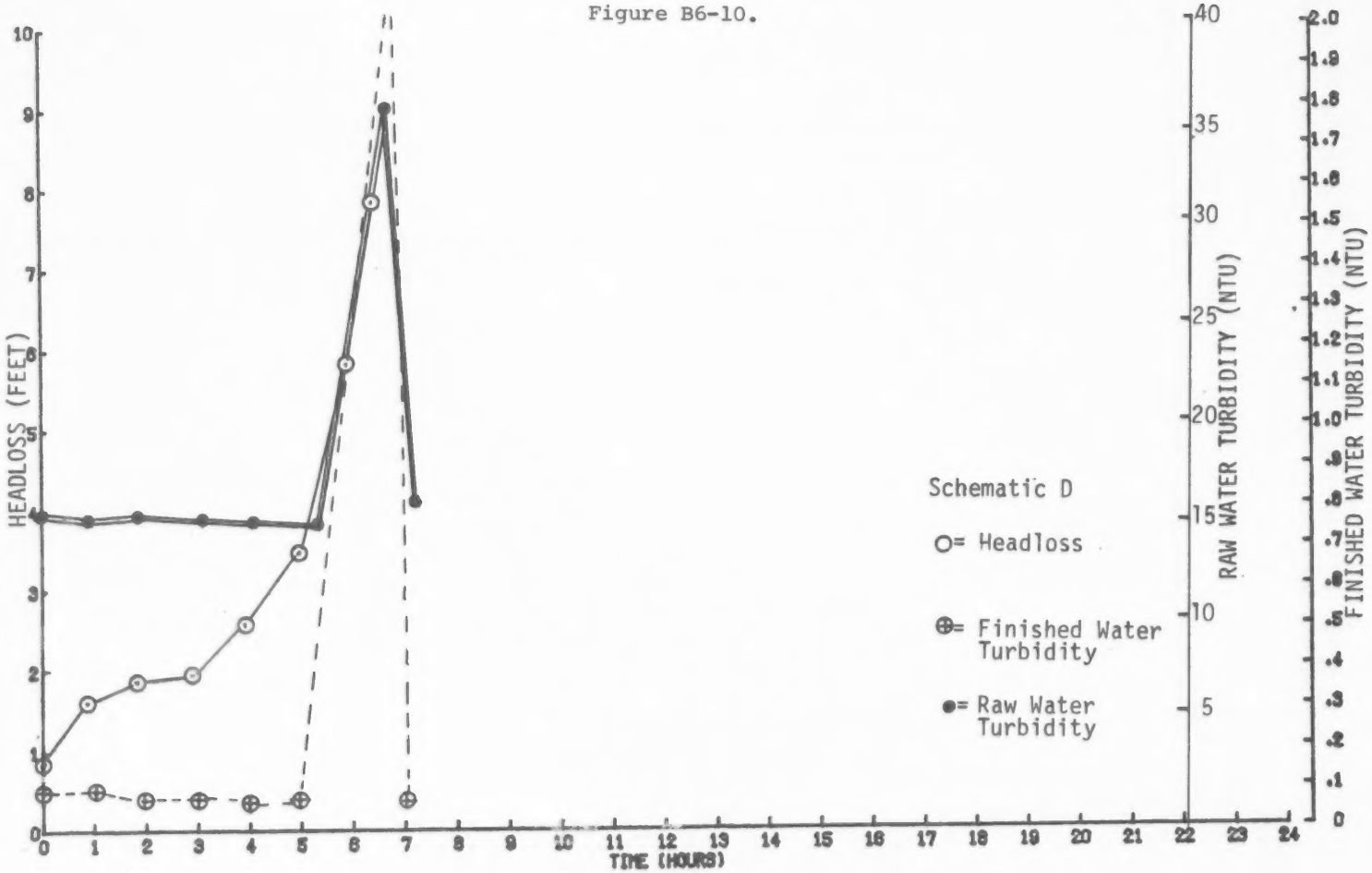
Figure B6-9.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160

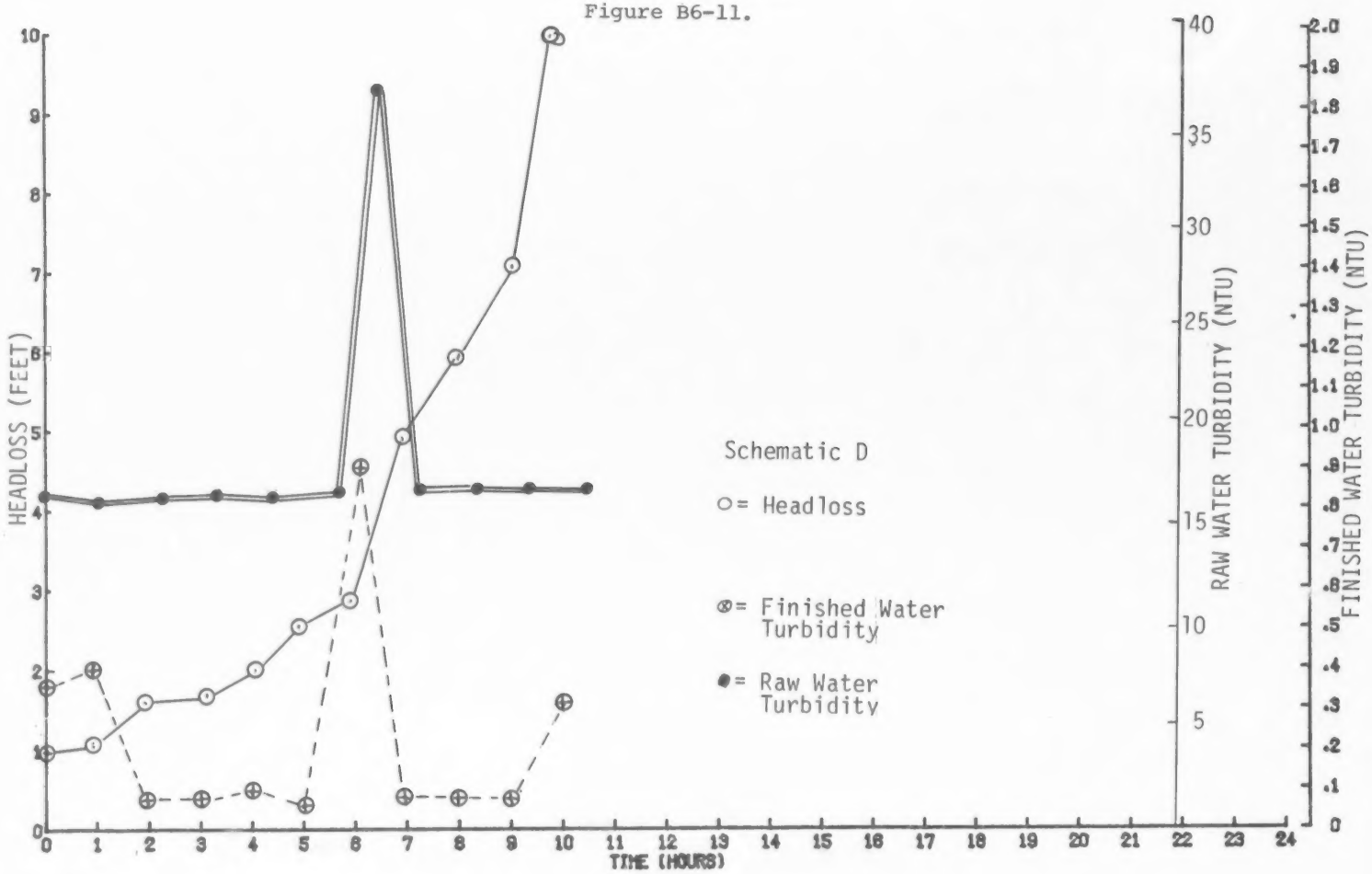
Figure B6-10.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160CC

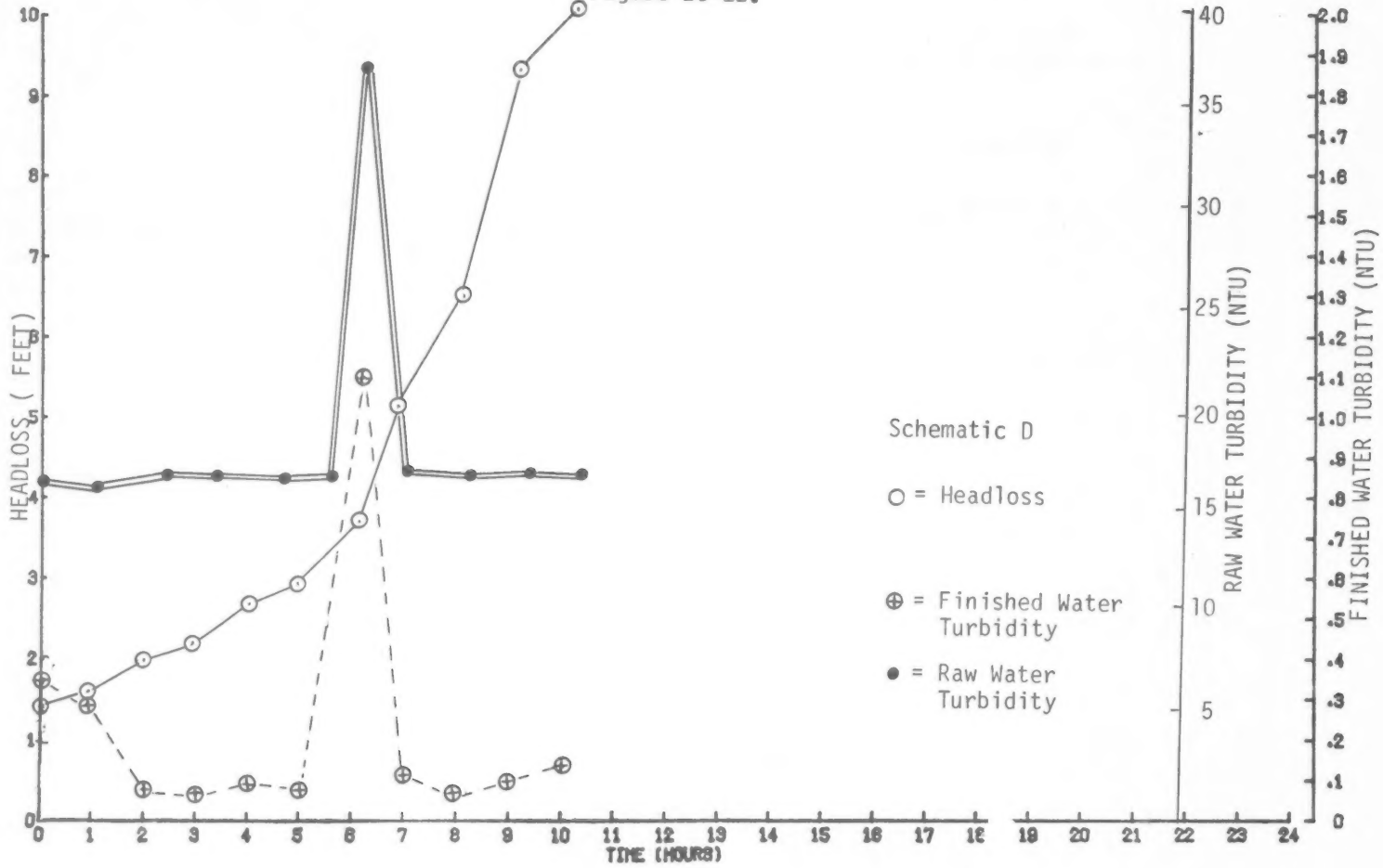
Figure B6-11.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160FC

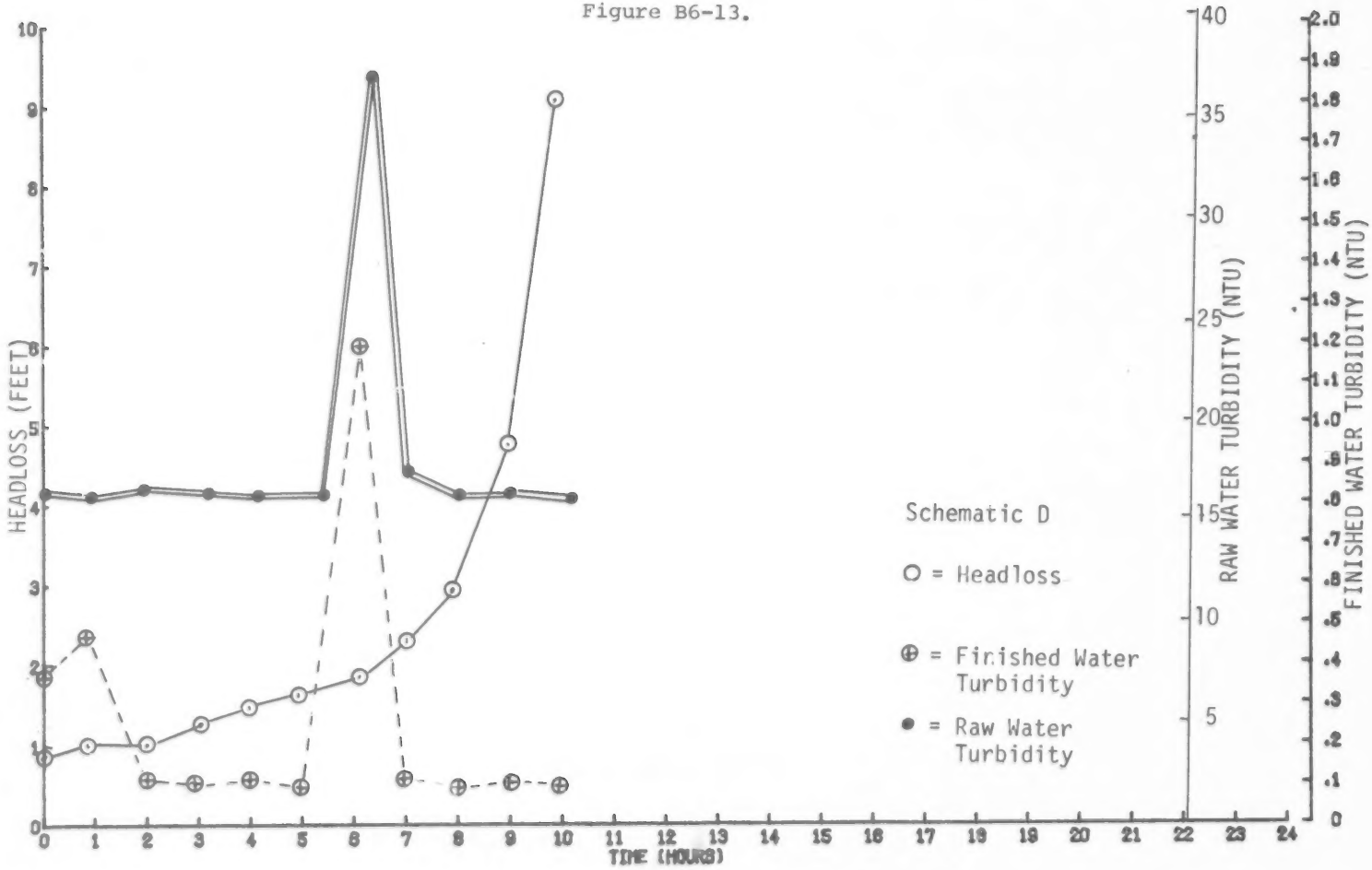
Figure B6-12.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 160MM

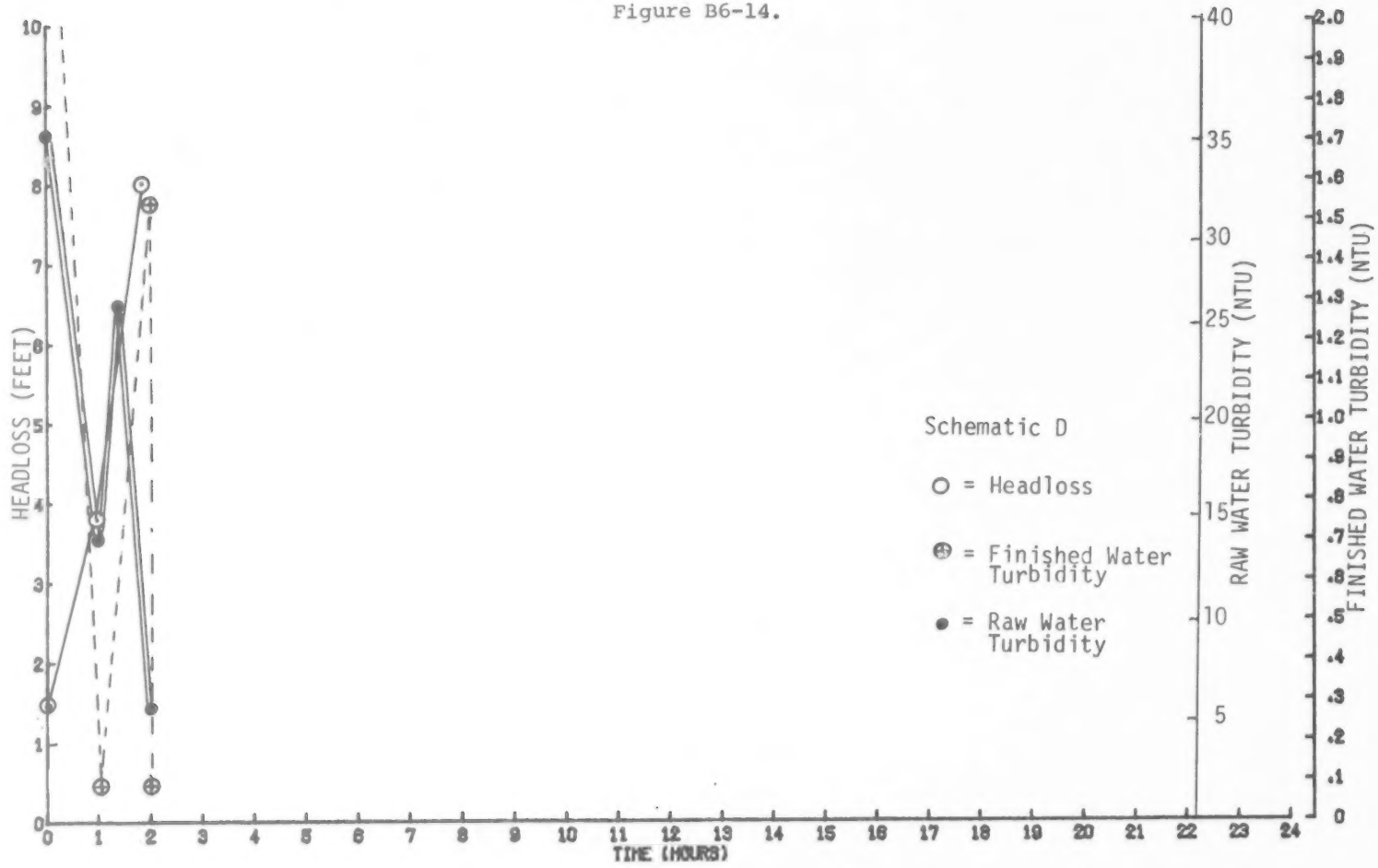
Figure B6-13.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162

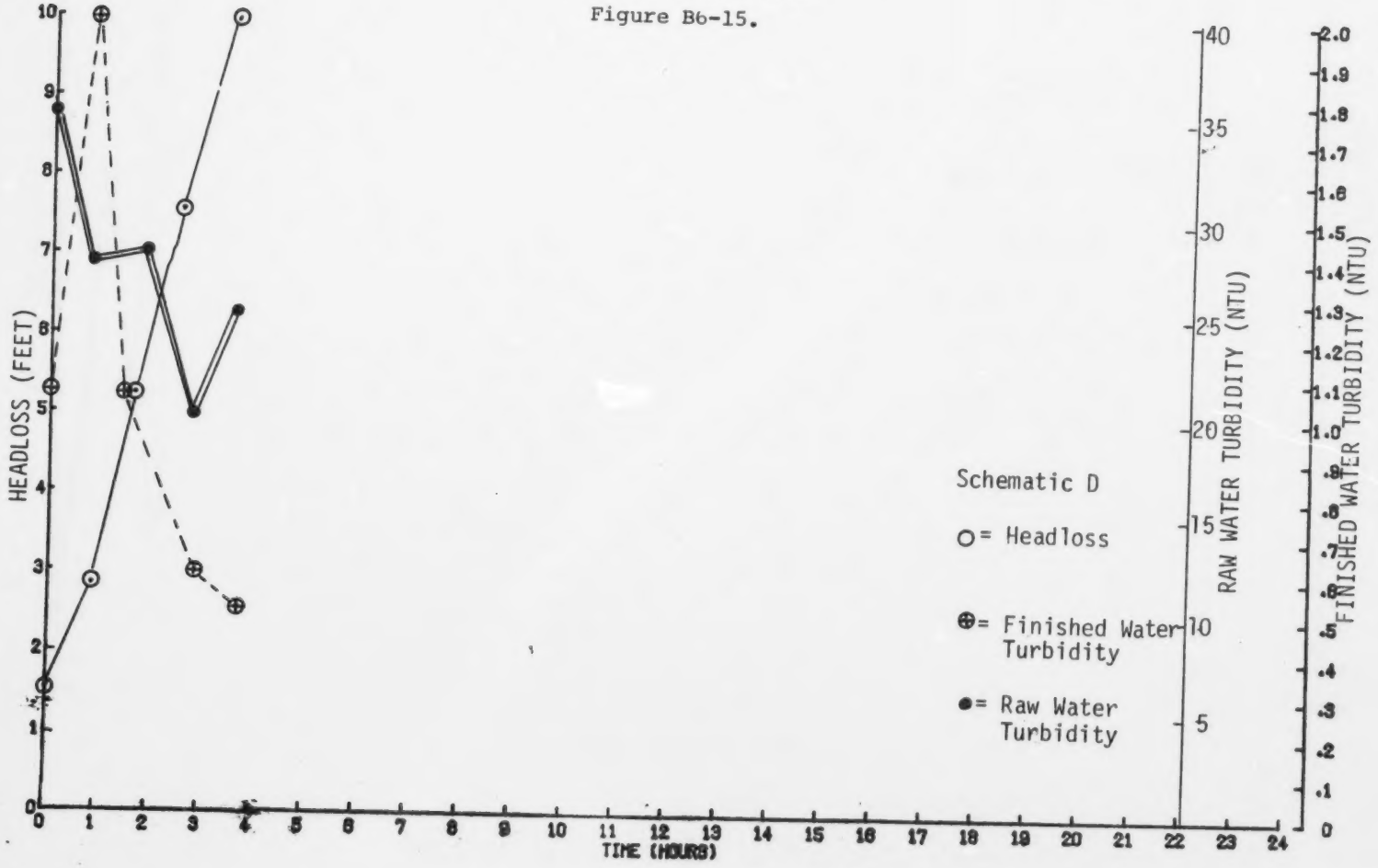
Figure B6-14.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162MM

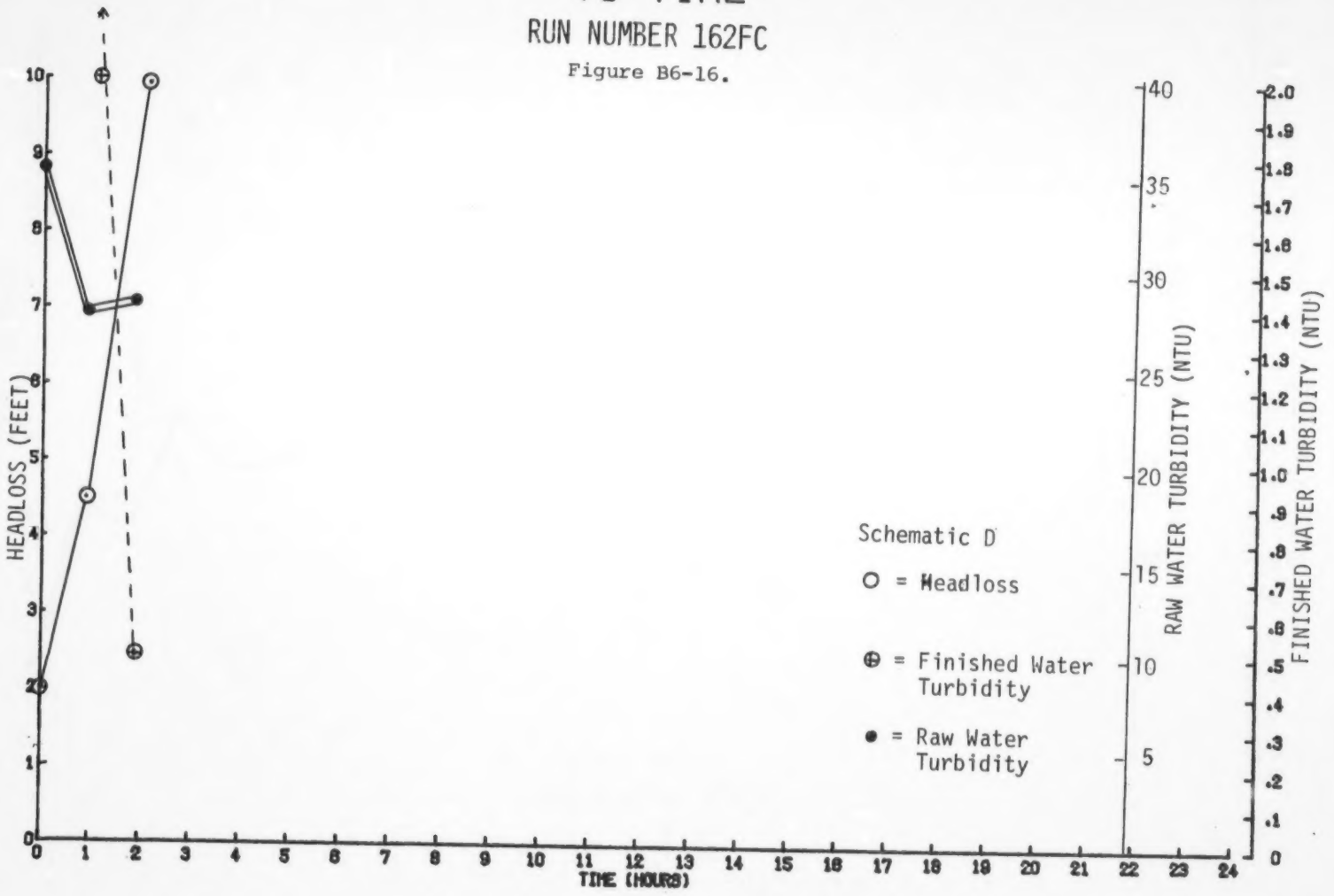
Figure B6-15.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162FC

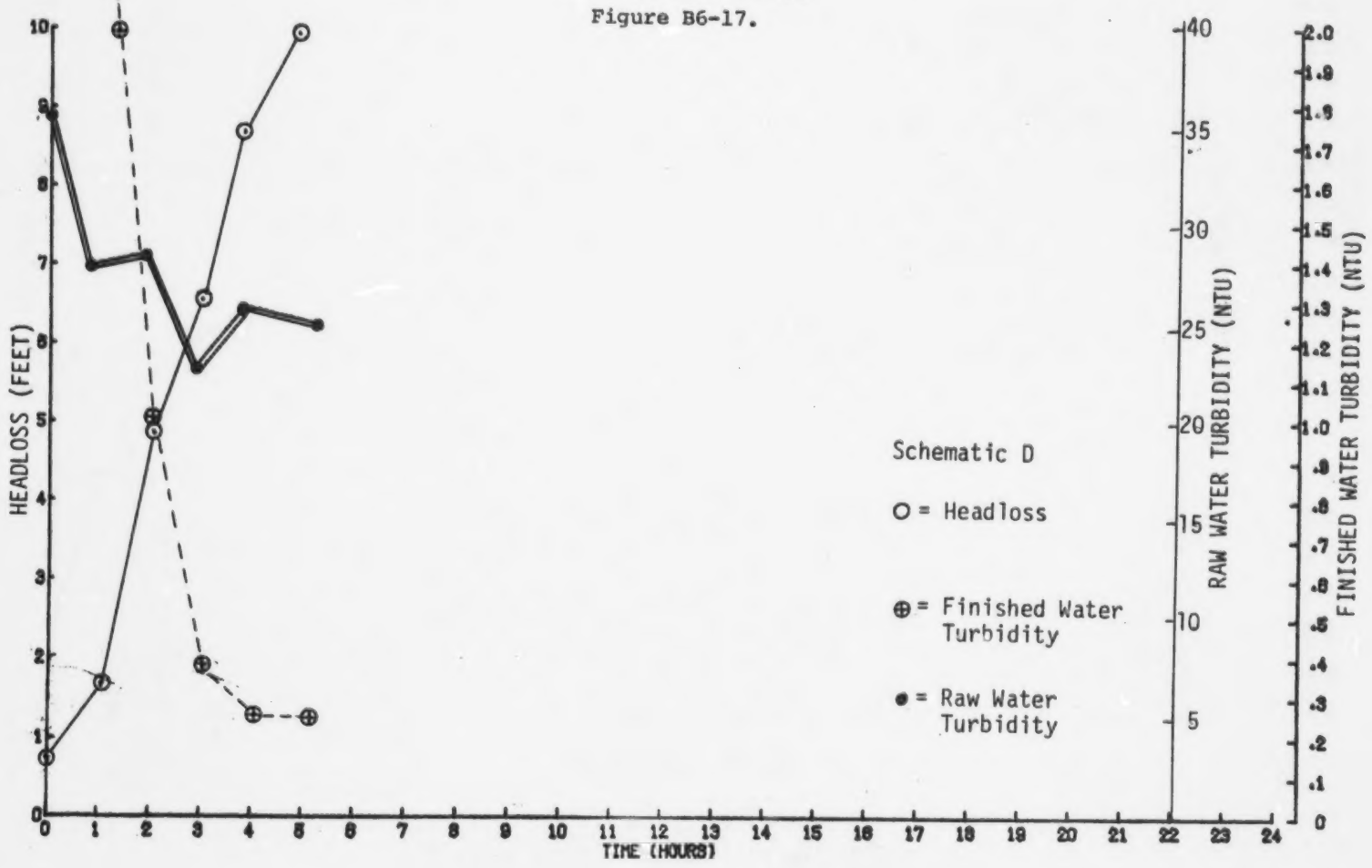
Figure B6-16.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 162CC

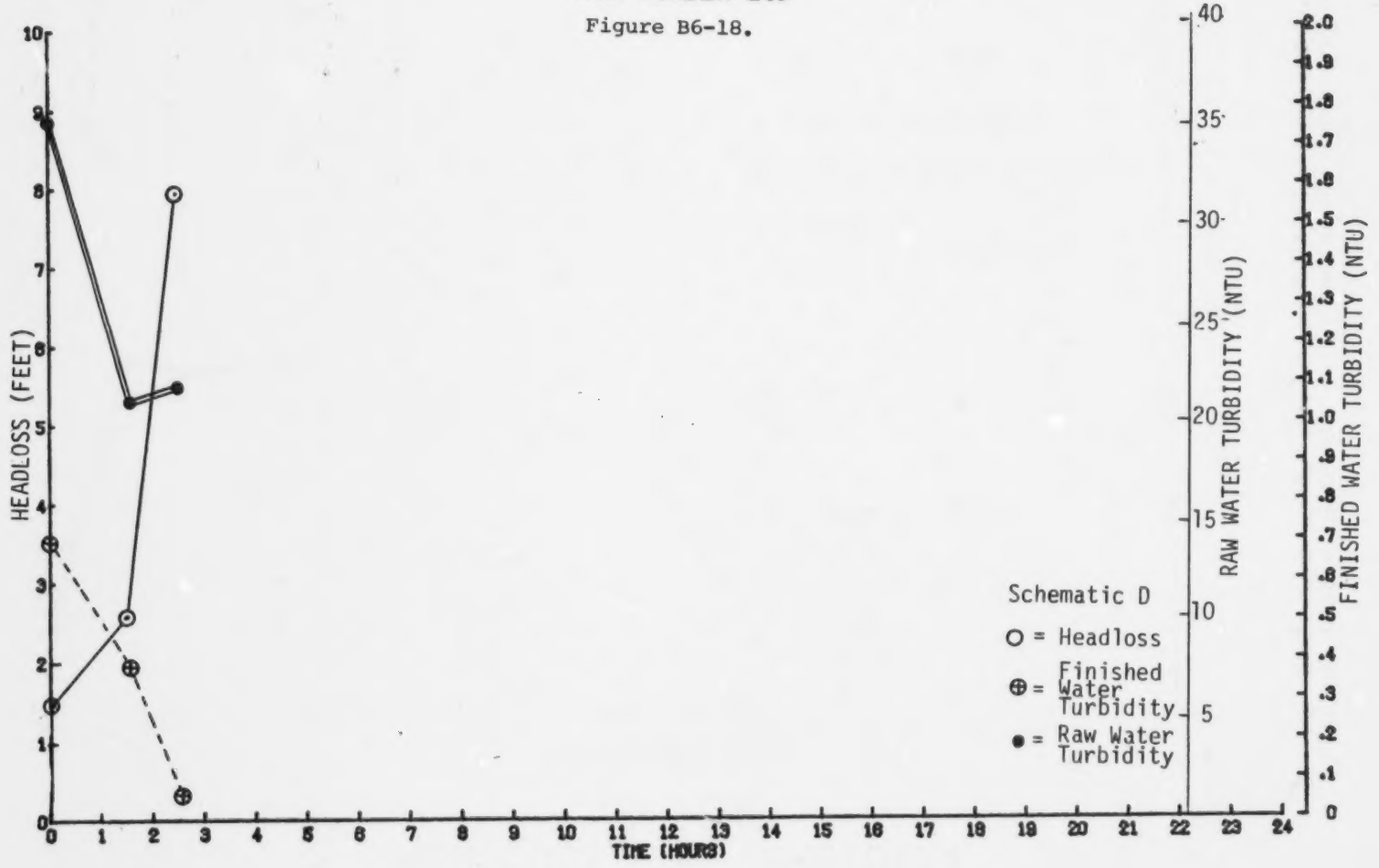
Figure B6-17.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163

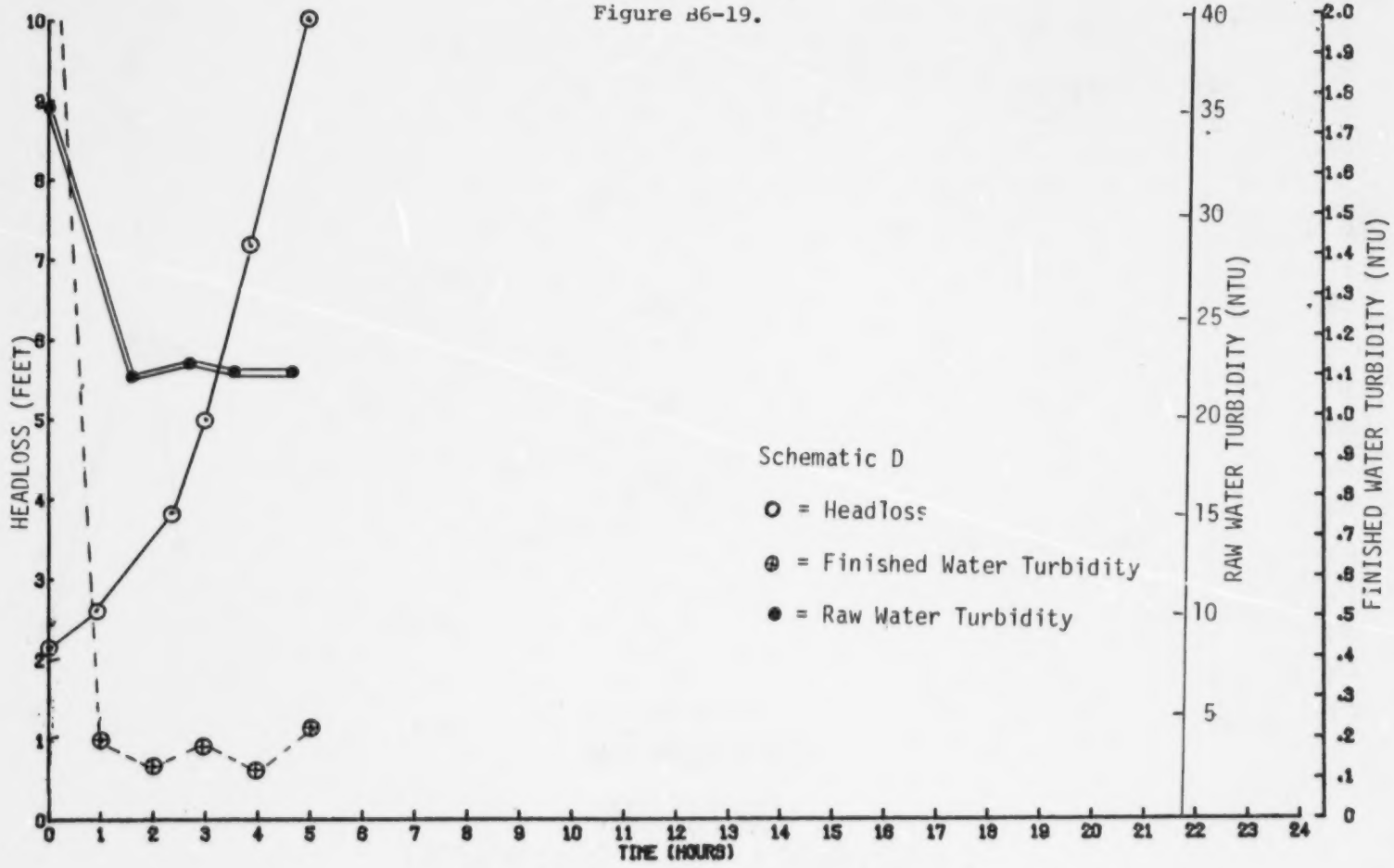
Figure B6-18.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163CC

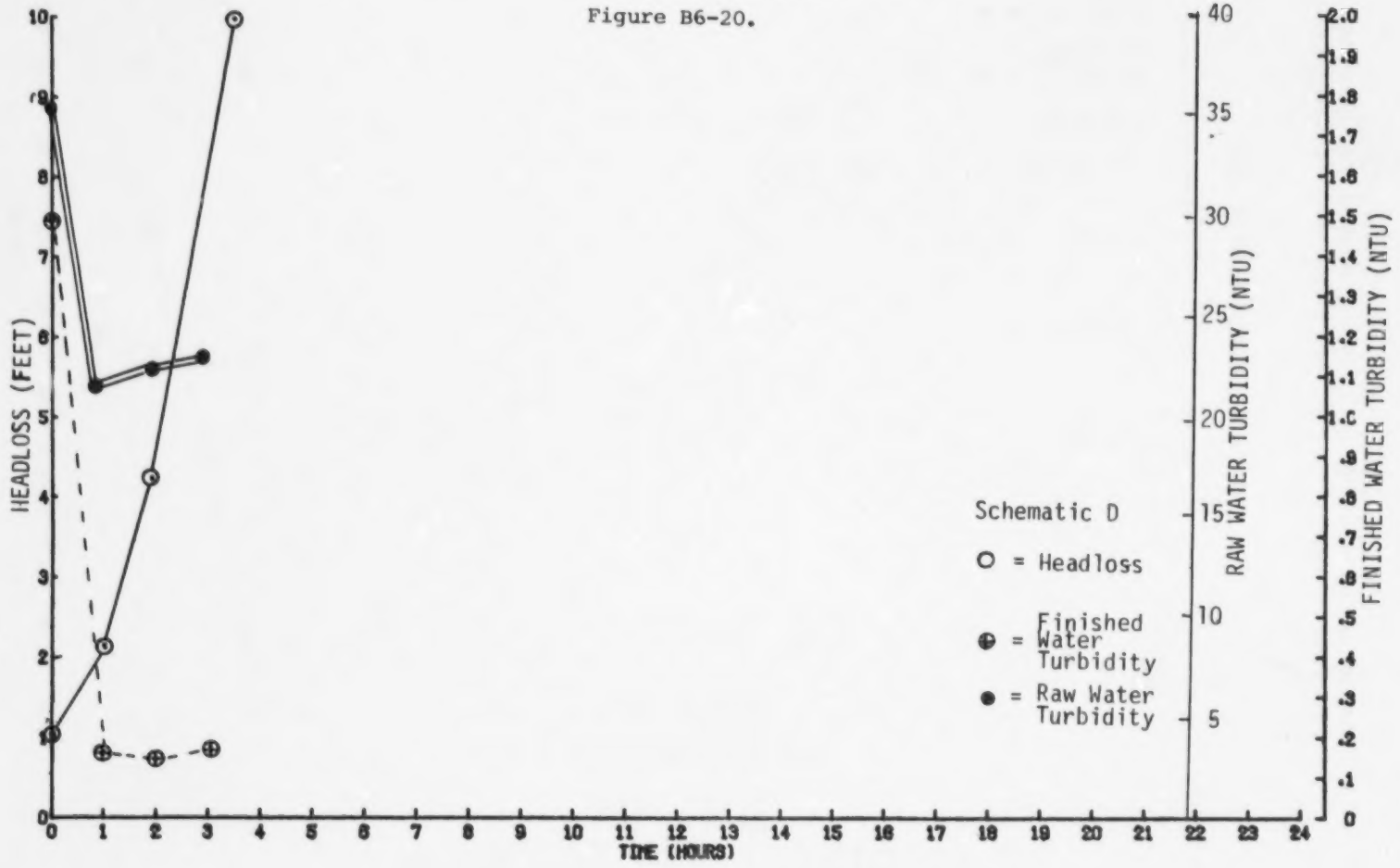
Figure 86-19.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163FC

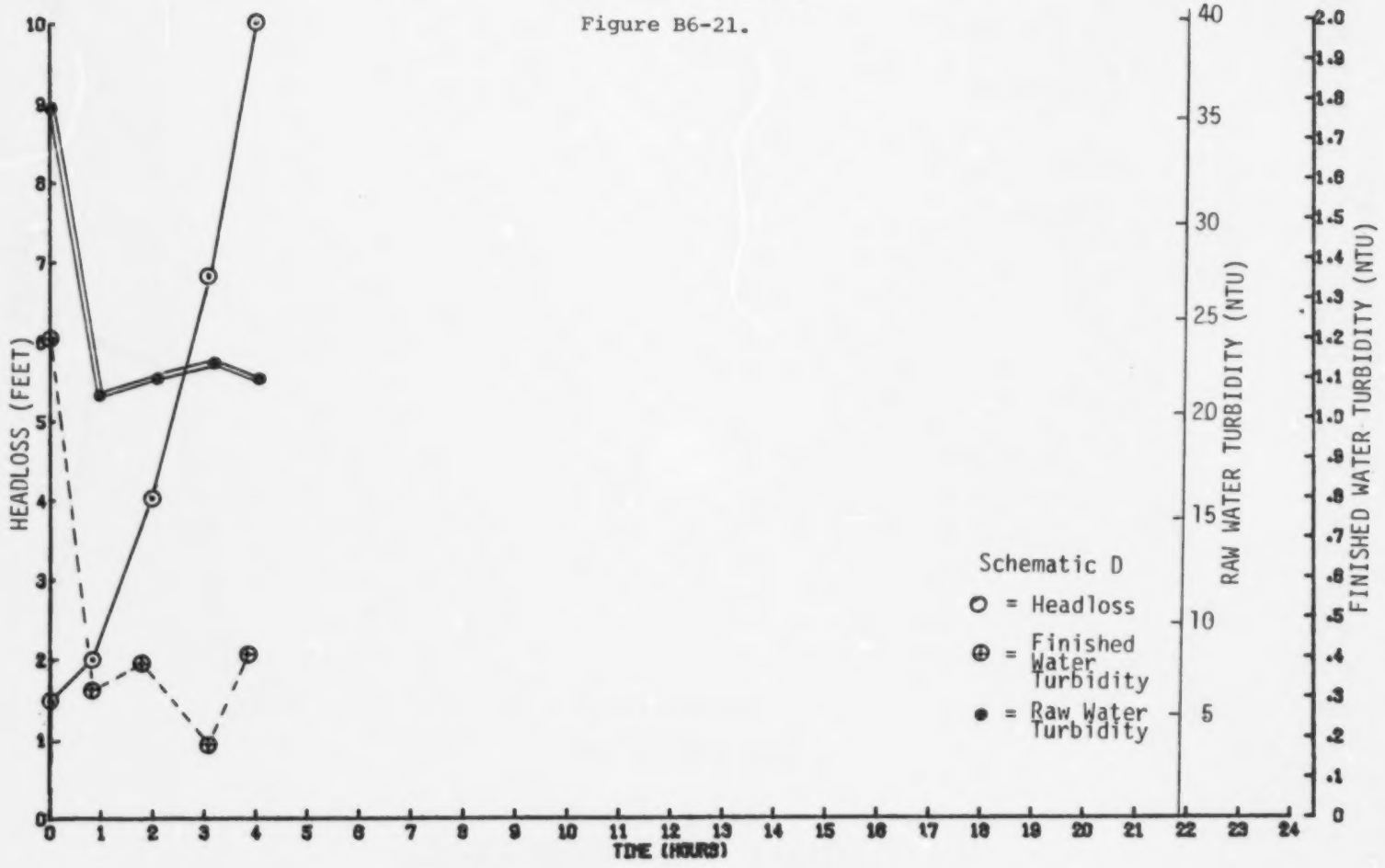
Figure B6-20.



HEADLOSS AND TURBIDITY VS TIME

RUN NUMBER 163MM

Figure B6-21.



APPENDIX B-7

SLUDGE SETTLEABILITY TESTING

I. INTRODUCTION

To assess the settling characteristics of the solids present in the backwash wastewater, sludge settling tests were conducted. Backwash wastewater was discharged into a settling basin where the solids would settle and accumulate. The clear supernatent was periodically drawn off and discharged to the North Fork Tolt River. Near the end of the pilot testing phase; the solids, which had been accumulating for about one year, were collected in a 55-gallon drum and transported to the Water Quality Laboratory. Settling tests were initially performed using a small, 2-liter, graduated cylinder and subsequently using a larger 6-inch diameter settling column. The column was equipped with a stirring mechanism that rotated at 1 RPM to facilitate movement of the water up through the solids. Various concentrations of sludge were prepared and added to the graduated cylinder or column. The downward velocity of the liquid-solids interface was measured at various time intervals. From this data, batch settling curves were prepared and were used to estimate the minimum surface area of the clarifier-thickener.

II. RESULTS

The results of the settling tests are listed in the tables below and are illustrated in Figures B7-1 through B7-4. Review of this information indicates that the solids generated during the filter backwashing process can be thickened to a concentration of 2-3% by gravity thickening methods.

TABLE B7-1. SETTLING INFORMATION USING THE GRADUATED CYLINDER

Sample	Sludge Concentration (mg/l)	Interface Settling Velocity		Solids Flux (lb/Ft^2-day)
		In./Min.	Ft./Day	
1	175	16-7/8"/5	408	4.5
2	245	16-7/8"/5	504	7.7
3	825	16"/4	480	24.7
4	2970	12.5"/7	216	40.0
5	3760	9"/6	180	42.2
6	6500	3"/7	51.6	20.9
7	11,000	2"/19	12	8.2
8	31,000	1/4"/20	1.2	2.3

TABLE B7-2. SETTLING INFORMATION USING THE 6-INCH DIAMETER COLUMN

Sample	Sludge Concentration (mg/l)	Interface Settling Velocity		Solids Flux (lb/Ft^2-day)
		In. or Ft./Min.	Ft./Day	
1	450	5'9.5"/16	520	15
2	650	5'/15	480	19
3	740	4'8.5"/18	380	18
4	1,000	3'4"/15	320	20
5	2,000	3'7.5"/16	330	41
6	2,400	4'3"/11	560*	84
7	7,600	6"/10	72	34
8	8,600	7.5"/27	33	17.7
9	11,000	8.5"/40	26	17.8
10	13,000	4.5"/30	18	15
11	20,000	2"/30	8	9.9
12	29,000	1"/80	1.5	2.7

*Does not seem to fit the rest of the data.

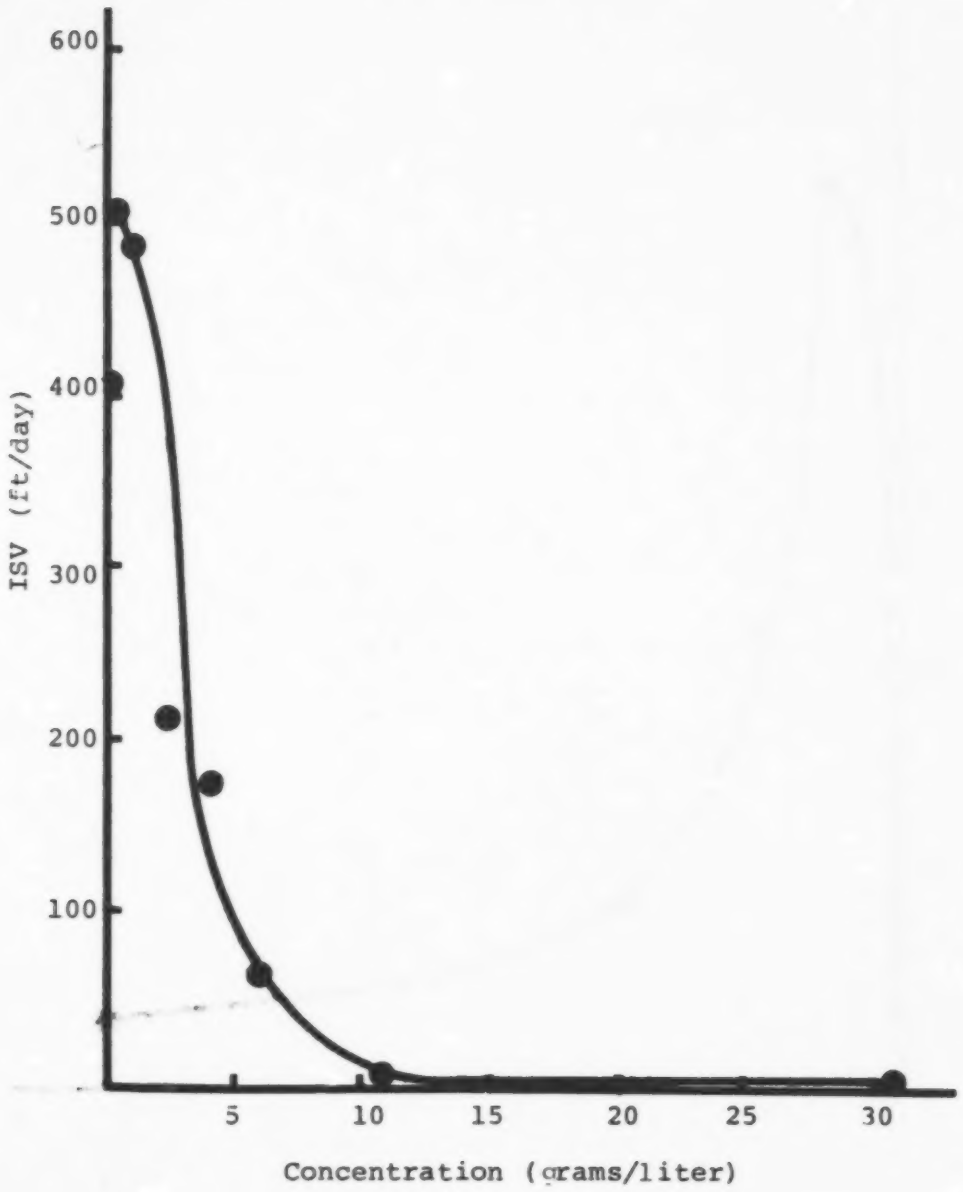


Figure B7-1. Cylinder interface settling velocity vs. concentration.

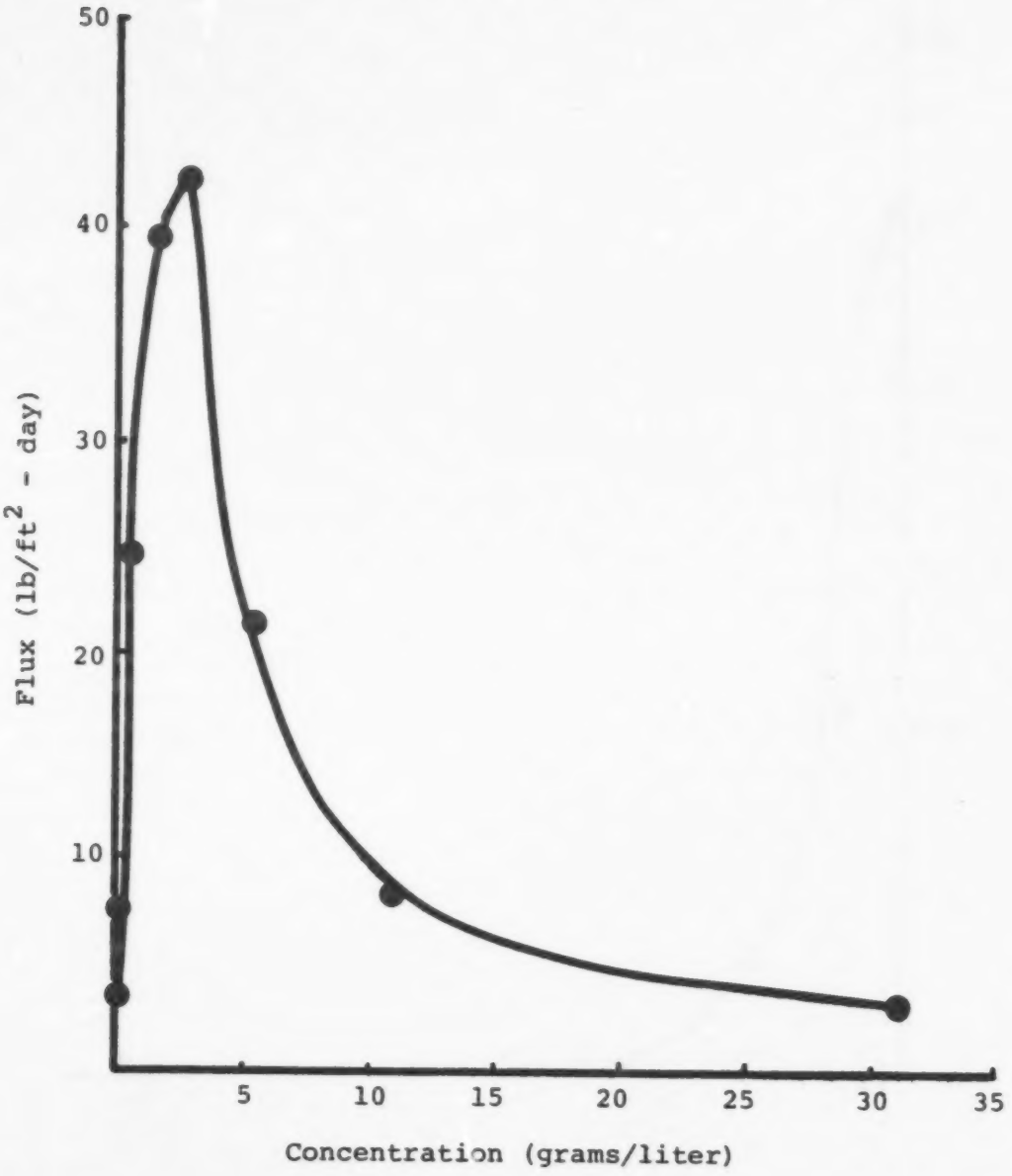


Figure B7-2. Cylinder flux curve for waste solids.

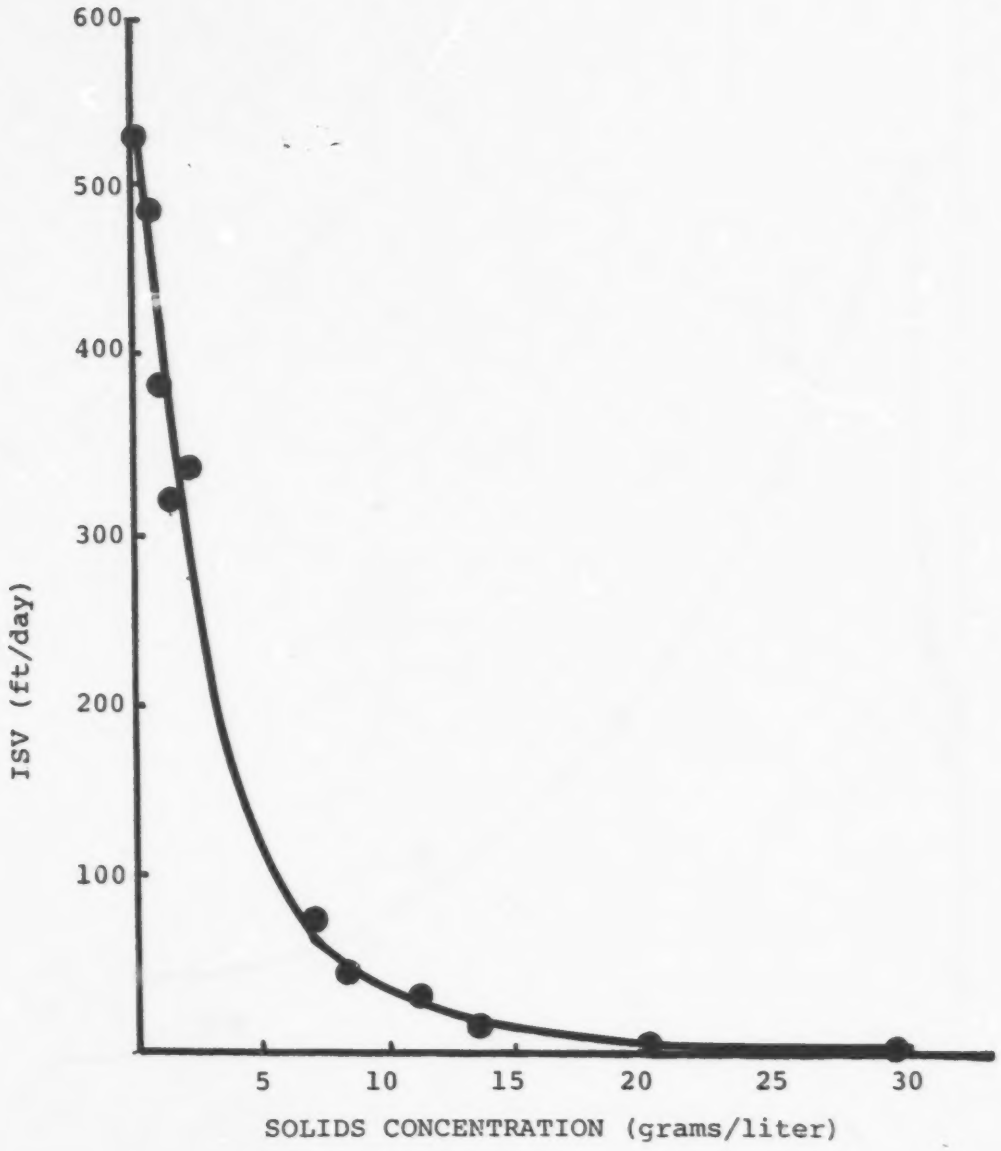


Figure B7-3. Column interface settling velocity vs. solids concentration.

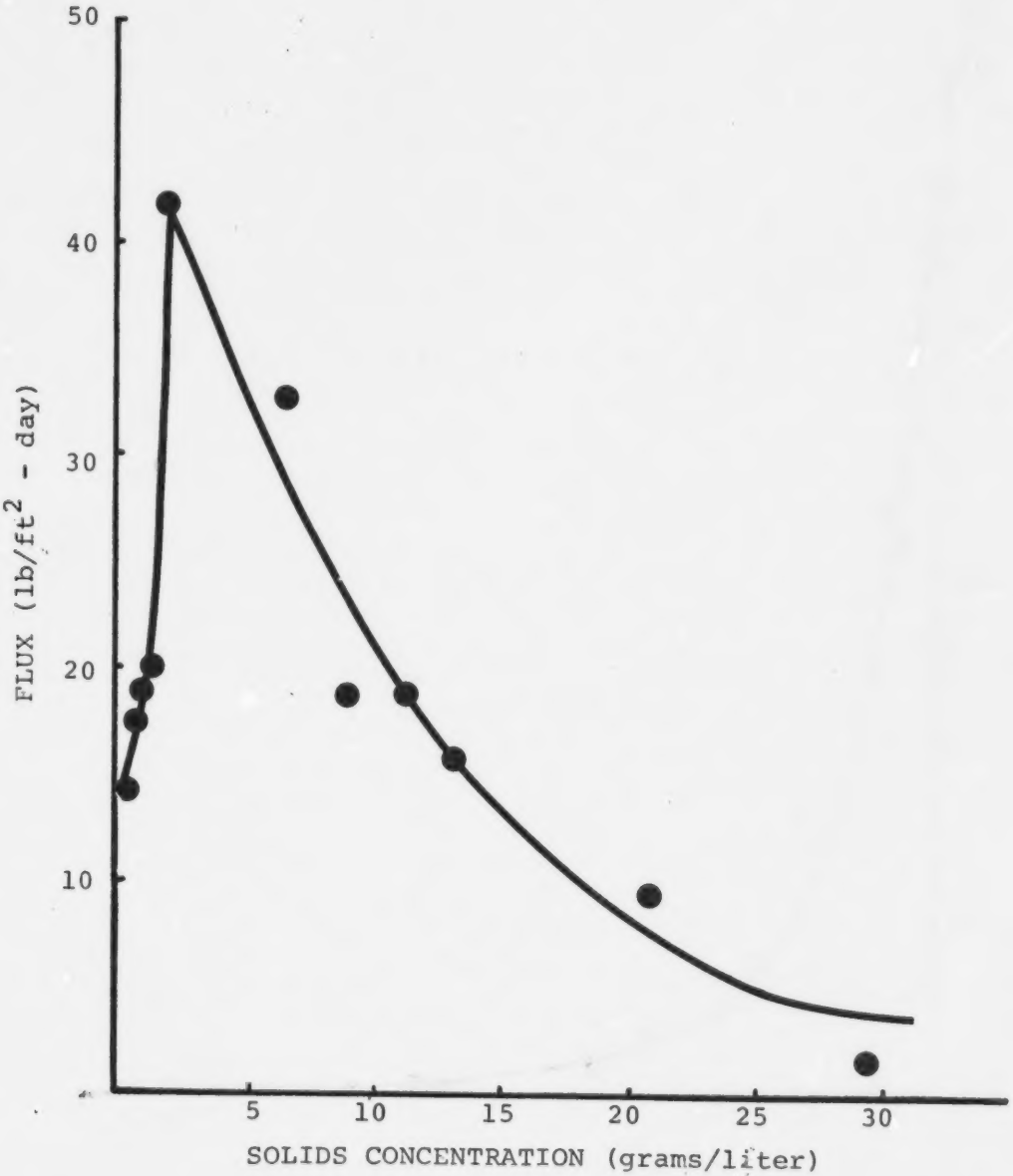


Figure B7-4. Column batch settling curve for waste solids.

APPENDIX B-8

DETAILED DOCUMENTATION OF COST INFORMATION

TABLE B8-1. OPERATIONAL COSTS

A.	LABOR			
	1. Operators.			
	3 shifts/day - 1095 shifts/yr			
	Assume 1.33 men/shift x 1095 - 1456 shifts/yr			
	Assume 5 x 52 = 260 shifts/yr/man			
	$\frac{1456}{260}$ = 5.6 men assume 6 men			
	6 @ (18,000 + 50% O.H.)		$162,000	
	2. Chief Operator/Chemist.			
	2 men @ (22,000 + 50% O.H.)		66,000	
	3. Maintenance and Sludge.			
	4 men @ (18,000 + 50% O.H.)		108,000	
				$336,000
B.	CHEMICAL USAGE (-ANNUAL) AND COST			
		$/Weight	Cost/Yr	
	1. Alum, 5000 ppd = 926 gpd			
	$\frac{365 \times 5000}{2000}$ = 912 T/yr	@ $100/T	91,200	
	365 x 926 = 338,000 gal/yr			
	2. Lime, 5150 ppd			
	$\frac{365 \times 5150}{2000}$ = 940 T/yr	@ $57/T	53,600	
	3. Polymer - Cationic, 1000 ppd			
	365 x 1000 = 365,000 lbs/yr	@ $.70/lb	255,500	
	Polymer - Anionic, 50 ppd			
	365 x 50 = 18,250 lbs/yr	@ $.70/lb	12,800	

(continued)

TABLE B8-1 (CONTINUED) OPERATIONAL COSTS

		$/Weight	Cost/Yr
4. Sodium Silicate, 2000 ppd			
$\frac{365 \times 2000}{2000}$ = 365 T/yr		@ $330/T	120,400
5. Sodium Bicarbonate, 3760 ppd			
$\frac{365 \times 3760}{2000}$ = 686 T/yr		@ $230/T	157,800
6. Chlorine, 750 ppd			
$\frac{365 \times 750}{2000}$ = 137 T/yr		@ $270/T	37,000
7. Fluoride, 1 ppm	500 lbs/day 91 T/yr	@ $84/T	38,700
			$767,000

C. POWER

	HP	KW	Use	KWH/Yr	
Motors Flocculators	90	67	10%	58,700	
Blowers	30	22	.4 hr/day	150	
Backwash	250	136	1.3 hr/day	490	
Service water	15	11	50%	48,200	
Washwater recovery	30	22	100%	192,700	
Sludge pumps	20	7	25%	30,600	
Chemical feeders	25	19	50%	83,200	
		334		414,000	
Misc. & Lighting		104	50%	455,000	
Total		438	=	869,000	KWH/Yr
				72,400	KWH/Mo

Monthly Charge

Demand	$ 6.00	
KW @ 1.00/KW over 10 KW (438 - 10) x 1	428.00	
Energy		
4000 KWH @ $.026/KWH	104.00	
(72,500 - 4000) @ 0.02	1370.00	
Total	$1908.00/Mo	= $22,900/Yr

(continued)

TABLE B8-1 (CONTINUED) OPERATIONAL COSTS

D. MAINTENANCE AND REPAIRS

3%/Yr x initial cost of major equipment

$$.03 \times \overbrace{(1.87 + .58 + \frac{1.68}{4})}^{2.87} 10^6 = \$86,100$$

equip. + I & C + EICC

TOTAL OPERATIONAL COST/YR	$1,212,000

TABLE B8-2. BACKGROUND INFORMATION FOR CONSTRUCTION COSTS.

Facility \ Division	Division 2 Sitework	Division 3 Concrete	Division 4 Not Used	Division 5 Metals	Division 6 Wood & Plastics	Division 7 Therm. & Moist. Prot.	Division 8 Doors & Windows	Division 9 Finishes	Division 10 Specialties	Division 11 Equipment	Division 12 Furnishings	Division 13 Special Constr.	Division 14 Conveying Syst.	Division 15 Mechanical	Division 16 Electrical	All Divisions Total
General	1,828,500	190,700		19,100						10,700		18,100		4,084,700		6,151,800
Landscaping	145,200															145,200
Control Building		28,500		63,600	2,100	2,600	9,200	13,300	1,200		5,000	75,000	700	104,200		305,400
Filter Complex		1,516,300		188,400	16,700	54,000	24,200	86,000		499,500			27,000	679,100		3,091,200
Chemical Complex		503,700		145,600	6,500	21,400	19,500	62,800	300	323,700			6,000	200,900		1,290,400
Floccula-tion Basins		266,800		41,700	8,000	21,600	1,400	5,300		165,000		11,500	1,200	115,000		637,700
Headworks & Energy Dissipation		29,600		13,600	700	1,800	1,400	3,900	100	64,500	100		7,700	235,100		358,500
Dewatering Facility		137,300		24,700	1,300	3,300	2,600	7,200		300,000			5,000	80,600		562,000
Sludge Thickeners		30,000		4,400	200	500	400	1,300		45,400			200	14,400		96,800
Sludge Thickener Pump Station		20,300		4,700	300	600	500	1,400		24,800			200	15,300		68,100
Clarifiers & Flow Distribution		308,400		28,900	1,600			8,400	300	330,500				52,400		730,500
Reservoir		775,000		16,800						2,700				20,900		815,400
Backwash Pump Station		41,900		8,400	400	1,000	800	2,400	100	101,500			400	27,300		184,200
Electrical															1,678,900	1,678,900
I & C												581,800				581,800
Total	1,973,700	3,848,500	Not Used	560,100	37,800	106,800	60,000	192,000	2,000	1,793,300	5,100	686,400	48,400	5,629,900	1,678,900	16,697,900

APPENDIX C-1

TABULATED CONDITIONS SURROUNDING EACH FILTER RUN

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time min	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
1	1-15	1.3	A	Alum = 10	24.0	6.0	229	46800	3.4	103	40170	6.5	2	8	720	5160	6.1	5.9	5.8	5.7		72.2	
2A	1-19	1.4	A	Alum = 10	12.0	3.0	160	66000	6.9	103	80300	13.0	10	15	1800	3732	6.6	6.0	5.5	5.3		88.9	
2B	1-22	1.4	A	Alum = 10	12.0	3.0	160	66000	6.9	103	80300	13.0	17	20	3060	3974	6.6	6.0	5.5	5.3		93.5	
2C	1-20	1.4	A	Alum = 10	12.0	3.0	160	66000	6.9	103	80300	13.0	11	18	1980	3785	6.6	6.0	5.5	5.3		89.9	
3	1-24	1.4	A	Alum = 10	12.0	3.0	160	66000	6.9	103	80300	13.0	8	16	1440	3585	6.6	6.0	5.5	5.3		86.1	Asbestos run.
4A	1-31	1.4	A	Alum = 10	11.0	2.8	160	65300	6.8	79	67200	14.2	14	22	2268	3476	6.7 6.7 6.7	6.5 6.5 6.6	6.2 6.1 6.4	6.3 6.3 6.9		91.2	
4B	2-2	1.4	A	Alum = 10	12.0	3.0	168	62400	6.2	79	61600	13.0	13	19	2340	3868	6.8 6.8	6.4 6.2	6.2 6.0	6.4 5.9		91.5	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time min	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft^2 run	Net Water Produced gal/ft^2 24 hr	Raw	RM	Floc	Fin			
4C	2-2	1.4	A	Alum = 10	12.2	3.0	168	62400	6.2	79	61600	13	10	15	1800	3732	6.8	6.1	5.8	6.1		88.9	Asbestos run.
5A	2-6	1.4	A	Alum = 10	12.3	3.1	168	62400	6.2	28.6	22300	13	9	16	1620	3667	6.9 6.2	5.2 6.2	5.2 6.5	6.3 6.9		87.7	
5B	2-8	1.4	A	Alum = 10	12.0	3.0	168	62400	6.2	28.6	22300	13	11	18.5	1980	3785	6.6 6.8	6.4 6.2	6.3 6.5	6.3 6.3		89.9	
5C	2-10	1.4	A	Alum = 10	12.0	3.0	168	62400	6.2	28.6	22300	13	9	17	1620	3667	6.3 6.9	6.2 6.2	6.1 6.4	6.3 6.6		87.7	Asbestos run.
6A	2-11	1.4	B	Alum = 10	12.0	3.0	888	1087	sec 1.2	---	-----	---	11	14	1980	3785	6.5 6.8	6.3 6.3	--- ---	6.4 6.4		89.9	
							888	1087	1.2														
							888	1087	1.2														
6B	2-13	1.3	B	Alum = 10	12.0	3.0	888	1087	sec 1.2	---	-----	--	12	12	2160	3830	6.3 6.2	5.9 5.8	--- ---	5.7 5.6		90.7	
							888	1087	1.2														
							888	1087	1.2														
6C	2-16	1.3	C	Alum = 10	12.0	3.0	888	1087	1.2 sec	---	-----	--	13	14	2340	3868	6.2 6.2	6.0 5.7	--- ---	6.5 5.9		91.5	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
6D	2-17	1.25	C	Alum = 10	11.6	2.9	888	1087	1.2	---	-----	---	13.5	13.5	2430	3884	6.3 6.6	5.7 6.3	--- ---	5.5 6.0		91.8	Asbestos run.
7	2-19	1.25	C	Alum = 15	12.2	3.0	888	1087	1.2	---	-----	---	11	12	1980	3785	6.3	5.4	---	5.5		89.9	
8	2-20	1.1	C	Alum = 20	11.6	2.9	888	1987	1.2	---	-----	---	12	12	2160	3830	6.9 6.9 6.9	5.2 5.4 5.6	--- --- ---	5.2 5.3 5.5		90.7	
9	2-20	1.1	C	Alum = 5	11.6	2.9	888	1087	1.2	---	-----	---	7	19	1260	3480	6.4 6.6 6.8	6.2 6.3 6.3	--- --- ---	6.1 6.1 6.4	5.5°	84.1	
10	2-21	1.15	C	Alum = 3	11.7	2.9	888	1087	1.2	--	-----	---	0	0	0	0	6.4	6.4	---	6.3	5.5°	0	
11	2-23	1.12	C	Alum = 5.9	11.6	2.8	761	1016	1.3	---	-----	---	0	24	0	0	6.5 6.4 6.8	7.1 6.3 6.3	--- --- ---	6.3 6.3 6.2	5.5°	0	Asbestos run.
12A	2-25	1.2	C	Alum = 12.6 Lime	11.2	2.8	761	1016	1.3	---	-----	---	17	18	2856	3690	6.6 6.7 6.5	6.8 6.8 6.8	--- --- ---	6.4 6.4 6.4	5.0°	93.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RN	Floc	Fin			
12B	2-26	1.2	C	Alum = 11.5 Lime	11.1	2.8	761	1016	1.3	---	-----	---	13	20	2184	3585	6.6 6.6	6.5 6.5	--- ---	6.4 6.4	5°	90.8	
12C	2-28	1.15	C	Alum = 11.5 Lime	11.2	2.8	761	1016	1.3	---	-----	---	15.5	17	2604	3657	6.8 6.5 6.6 6.5	6.7 6.4 6.4 6.3	--- --- --- ---	6.6 6.5 6.6 6.7	6°	92.3	
12D	3-3	1.0	C	Alum = 10 Lime = 3.4	13.2	3.3	940	1034	1.1				19	20	3762	4437	7.3 6.8 6.7 6.8	7.3 6.4 6.5 6.4	--- --- --- ---	7.5 6.8 6.7 6.7	6°	94.7	Asbestos run.
14	3-6	1.1	C	Alum = 17 Lime = 6.2	12.5	3.1		SAME AS	RUN	12D			0	12	0	0	6.4 6.6 6.7 6.5	6.1 6.0 6.0 6.1	--- --- --- ---	6.0 5.9 5.9 6.1	6°	0	
15	3-8	0.99	I	Alum = 9.8	12.2	3.0	175	66468	6.3 min				17	20	3060	3974	7.2 6.8 6.7	6.7 6.5 6.5	6.7 6.5 6.5	6.8 6.5 6.4	5.5°	93.5	
16	3-9	0.95	A	Alum = 10 Alum = 10 Lime = 3.1	12.1	3.0	175	66468	6.3 min	73	56940	13.0	14	35	2520	3900	6.4 6.6 6.7 6.5	6.7 6.4 6.7 6.5	6.4 6.4 6.7 6.2	6.3 6.5 6.6 6.2	5.5°	92.1	
17	3-12	1.15	A	Alum = 10 Lime = 3.7	11.2	2.8	175	66468	6.3 min	193	150540	13.0	17	35	2856	3690	6.7 6.7 6.5 6.5	6.3 6.3 6.3 6.3	6.2 6.4 6.5 6.4	6.4 6.3 6.0 6.0	6°	93.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
18	3-14	0.89	A	Alum = 10 Lime	24.0	6.0	247	45900	3.1 min	193	75270	6.5	0	11	0	0	6.7 6.7 6.7	6.3 6.3 6.4	6.3 6.3 6.3	6.1 6.1 6.1	6°	0	
19	3-16	1.0	A	Alum = 11.8 Lime = 3.9	17.1	4.3	203	57246	4.7 min	193	113484	9.8	3	15	774	4076	6.4 6.4	6.3 6.2	6.3 6.2	6.2 6.1	6°	74.2	
20	3-22	0.77	C	Alum = 9.2 Lime = 3.2 1986N = 0.03	11.8	3.0	996	1124	1.1	---	-----	---	17	18	3060	3974				6.1	6°	93.5	
21	3-24	0.70	C	Alum = 9.2 Lime = 4.3 1986N = 65 ppb	13.0	3.25	996	1124	1.1	---	-----	---	16	17	3120	4307	6.6	6.4	---	6.1	6°	93.6	Asbestos run.
22	4-6	0.62	C	Alum = 5.6 Lime = 3.2 1986N = 100 ppb	12.0	3.0	880	1076	1.1	---	-----	---	11	15 to 7	1980	3785	6.6 6.4	6.7 6.5	--- ---	6.3 6.4	9°	89.9	
23	4-8	0.63	C	Alum = 6.0 Lime = 3.2 1986N = 40 ppb	12.0	3.0	880	1076	1.1	---	-----	---	10	17	1800	3732	6.7 6.7 5.8	7.0 7.1 6.9	--- --- ---	6.9 6.9 6.9	8°	88.9	
24	4-11	0.60	C	Alum = 7.0 Lime = 4.1 1986N = 20 ppb	12.7	3.2	970	1105	1.1	---	-----	---	17	21 to 7	3264	4258	6.5 6.9 6.8	7.6 7.6 7.5	--- --- ---	7.4 7.4 7.3	8°	93.9	Asbestos run.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec⁻¹	GT	Time sec	G sec⁻¹	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft² run	Net Water Produced gal/ft² 24 HR	Raw	RM	Floc	Fin			
25	4-13	0.65	C	Alum = 7.5 Lime = 4.7 1986N = 20 ppb	15.0	3.7	1210	1184	.98	---	-----	---	13	14	2925	4927	6.6	---	6.7	6.6	8°	93.2	
26	4-16	0.60	C	Alum = 7.0 Lime = 4.4 1849A = 20 ppb	16.0	4.0	1452	1316	.91	---	-----	---	13.5	13.5	3240	5298	---	---	---	---	8.5°	93.8	
27	4-17	0.62	C	Alum = 7.0 Lime = 4.4	16.2	4.0	1441	1324	.92	---	-----	---	12	13.5	2880	5240	6.8 6.9	6.7 6.7	--- ---	6.3 6.5	8.5°	93.1	
28	4-19	0.63	C	Alum = 7.0 Lime = 4.4 1849A = 20 ppb	15.9	4.0	1402	1294	.92	---	-----	---	10	13.5	2400	4816	6.4 6.4	6.5 6.5	--- ---	6.6 6.6	8°	91.7	
29	4-20	0.69	C	Alum = 7.0 Lime = 4.1 1849A = 20 ppb	12.7	3.2	970	1105	1.1	---	-----	---	15	18	2880	4211	6.7 6.7	6.6 6.7	--- ---	6.4 6.7	8.5°	93.1	Asbestos run
30	4-25	0.58	C	Alum = 10 Lime = 6.2 1986N = 20 ppb	15.9	4.0	1402	1294	.92	---	-----	---	9	10	2160	5067	6.5 6.5 6.5	6.3 6.4 6.4	--- --- ---	6.2 6.0 6.1	9°	90.7	
31	4-26	0.64	C	Alum = 10 Lime = 6.2 1986N = 70 ppb	16.5	4.1	1503	1336	.89	---	-----	---	9	9.5	2214	5207	6.6 6.5 6.5	6.5 6.4 6.5	--- --- ---	6.5 6.5 6.5	9°	91.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ HR}$	Raw	RM	Floc	Fin			
32	5-3	0.64	C	Alum = 10 Lime 1986N = 70 ppb	12.7	3.2	970	1105	1.1	---	-----	---	14	14	2683	4183	6.6 6.6 6.6	6.5 6.6 6.6	--- --- ---	6.6 6.7 6.6	10°	92.5	
33	5-5	0.65	C	Alum = 10 Lime 1986N = 70 ppb	12.2	3.0	880	1076	1.2	---	-----	---	12	12	2160	4630	6.6 6.6 6.6	6.5 6.6 6.6	--- --- ---	6.6 6.7 6.6	9	90.7	Asbestos run.
34	5-7	0.62	C	Alum = 10 Lime N-17 = 70 ppb	12.7	3.2	970	1105	1.1	---	-----	---	15	19	2880	4211	6.5 6.4 6.4	6.4 6.4 6.4	--- --- ---	6.6 6.5 6.7	10°	93.1	No turb removal during last 3 hrs of run. Maybe due to feeding of lime slurry instead of saturated sol.
35	5-8	0.62	C	Alum = 10 Lime = 7.7 N-17 = 20 ppb	11.9	3.0	880	1076	1.2	---	-----	---	14	14	2520	3900	6.6 6.6 6.5	6.7 6.7 6.6	--- --- ---	6.8 6.7 6.6	10°	92.1	
36 thru 38	5-10 thru 5-12	----	C	see comments																			Run data gathered under varying conditions to determine upper & lower pH values for coagulation with alum.
39	5-12	0.58	C	Alum = 10 Lime N-17 = 20 ppb	11.2	2.8	761	1016	1.3	---	-----	---	5	17	840	2870	6.7 6.5 6.5	6.8 6.7 6.9	--- --- ---	6.7 6.3 6.4	10°	76.2	
40	5-13	0.62	E	Alum = 10 Lime N-17 = 65 ppb	16.5	4.1	1331	248000	3.1 min	70	39400	9.4	11	11	2706	5333	6.4 6.4 6.3	6.9 6.9 6.8	6.0 6.1 6.1	6.8 6.8 6.7	9°	92.6	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec⁻¹	GT	Time min	G sec⁻¹	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft² run	Net Water Produced gal/ft² 24 hr	Raw	RM	Floc	Fin			
41	5-14	0.59	E	Alum = 10 Lime N-17 = 20 ppb	16.1	4.0	1333	248000	3.1	70	40400	9.7	6	16	1440	4720	6.4 6.4 6.3	6.0 6.0 6.0	6.0 6.1 6.1	6.1 6.2 6.1	10°	86.1	
42	5-15	0.60	J	Alum = 10 Lime N-17 = 65 ppb	16.0	4.0	1333	248000	3.1	70	40400	9.7	9	14	2160	5067	6.4 6.4 6.5 6.5	6.1 6.1 6.2 6.1	6.2 6.2 6.2 6.2	6.2 6.2 6.3 6.3	10°	90.7	
43	5-16	0.60	J	Alum = 10 Lime N-17 = 35 ppb	16.0	4.0	1333	248000	3.1	70	40400	9.7	5	9	1230	4649	6.4 6.3	6.0 6.1	5.9 6.1	6.1 6.2	10°	83.7	
44	5-17	0.60	F	Alum = 10 Lime = 4.9 N-17 = 50 ppb	11.8	2.9	1333	336000	4.2	167	132000	13.2	13	23	2262	3727	6.4 5.4 6.3 6.4	5.8 5.8 6.0 5.9	5.8 5.8 5.9 5.8	5.9 6.1 6.0 6.2	10°	91.2	Asbestos run.
45	5-21	0.60	E	Alum = 10 Lime = 4.9 N-17 = 140 ppb	12.2	3.0	1333	328000	4.1	167	128000	12.8	14	17 to 5.5' headloss	2520	3900	6.4 6.4 6.3 6.4	5.9 5.7 5.8 5.6	6.0 5.8 5.8 5.7	6.0 5.8 5.8 5.9	10°	92.1	
46	5-22	0.55	F	Alum = 10 Lime = 4.9 1986N = 20 ppb	16.5	4.1	1333 1078	248000 200000	3.1 3.1	---	-----	---	5	17	1230	4649	6.3 6.3 6.3 6.3	5.8 5.8 5.8 5.8	5.7 5.8 5.8 5.8	6.1 6.1 6.1 6.0	10°	83.7	
47	5-23	0.58	F	Alum = 10 Lime 1986N = 50 ppb	16.5	4.1	SAME AS RUN #46			---	-----	---	9	17	2214	5207	6.3 6.3 6.3 6.3	6.1 6.0 6.0 6.0	6.2 6.1 6.0 6.0	6.3 6.2 6.2 6.1	9.5°	91.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
48	5-24	0.58	F	Alum = 10 Lime = 4.9 1986N = 100 ppb	16.5	4.1	1333	248000	3.1 min	---	-----	---	11.5	12	2829	5358	6.3 6.3 6.3	6.1 6.1 6.1	6.0 6.0 6.0	6.1 6.0 6.0	10°	92.9	
							1078	200000	3.1 min														
49	5-25	0.60	F	Alum = 10 Lime = 4.9 N-17 = 20 ppb	16.4	4.1	SAME	AS RUN	#48	---	-----	---	5.5	19	1353	4763	6.3 6.3 6.3 6.3	6.1 6.1 6.1 6.1	6.1 6.1 6.1 6.2	6.2 6.2 6.2 6.0	10°	85.2	
50	5-31	0.56	K	Alum = 8 Lime = 4.9 N-17 = 100 ppb	16.3	4.1	1452	1316	sec 0.91	---	-----	---	12	13	2952	5381	6.3 6.3 6.3 6.3	6.2 6.2 6.2 6.2	--- --- --- ---	6.3 6.3 6.2 6.3	11°	93.2	
							1452	1316	0.91														
51	6-1	0.56	L	Alum = 10 Lime N-17 = 100 ppb	16.0	4.0	SAME	AS RUN	#48	---	-----	---	7	14	1680	4869	6.3 6.3 6.3 6.3	6.1 6.1 5.8 5.8	--- --- --- ---	6.1 6.0 5.9 5.9	11°	88.1	Asbestos run.
52	6-7		G																				Conducted under varying conditions to determine effectiveness of CATFLOC T-1 as primary coagulant.
53	6-8	0.48	G	CATFLOC T-1 = 3 mg/l	16.4	4.1	SAME	AS RUN	#48	---	-----	---	7	25	1722	5007	6.3 6.3 6.3 6.3	--- --- --- ---	--- --- --- ---	6.2 6.3 6.3 6.3	12°	88.4	Asbestos run.
54 thru 59	6-11 thru 6-21		G																				Conducted under varying conditions to optimize CATFLOC T-1 and alum.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time min	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
60	6-26	0.4	G	Alum = 4 CATFLOC T-1 = 0.8 mg.1	16.3	4.1	1333 1078	248000 200000	3.1 3.1	---	-----	---	0	25	0	0	6.4 6.4 6.3 6.3	6.3 6.3 5.9 6.0	--- --- --- ---	6.3 6.3 5.9 6.0	12°	0	
61	6-26	0.40	G	Alum = 2 CATFLOC T-1 = 1.6 mg/1	16.4	4.1	SAME	AS RUN	#60	---	-----	---	7	24 to 6.25' headlos	1722	5007	6.3 6.3 6.3 6.3	6.0 6.1 6.1 6.2	--- --- --- ---	6.0 6.1 6.2 6.	12°	88.4	
62	6-28	0.40	G	Alum = 3 CATFLOC T-1 = 2 mg/1 1986N = 100 ppb	16.4	4.1	SAME	AS RUN	#60	---	-----	---	13	20	3198	5421	6.8 6.7 6.8 6.8	6.5 6.5 6.4 6.6	--- --- --- ---	6.5 6.5 6.5 6.5	12°	93.8	Asbestos run.
63	6-29	0.39	G	Alum = 3 CATFLOC T-1 = 2 mg/1 1986N = 150 ppb	16.8	4.2	SAME	AS RUN	#60	---	-----	---	13.5	21	3402	5580	6.4 6.4 6.4	6.5 6.5 6.6	--- --- ---	6.5 6.5 6.5	12°	94.1	
64	7-2	0.40	G	Alum = 3 CATFLOC T-1 = 2 mg/1 CA233 = 100 ppb	17.3	4.3	SAME	AS RUN	#60	---	-----	---	8.5	22	2193	5445	6.4 6.4 6.6 6.5	6.5 6.4 6.6 6.5	--- --- --- ---	6.5 6.4 6.6 6.5	12°	90.9	
65	7-4	0.40	G	Alum = 3 CATFLOC T-1 = 2 mg/1 CA233 = 300 ppb	16.6	4.1	SAME	AS RUN	#60	---	-----	---	17	17	4182	5534	6.4 6.4 6.6	6.5 6.5 6.4	--- --- 6.4	6.5 6.5	12°	95.2	
66	7-5	0.38	G	Alum = 3 CATFLOC T-1 = 2 mg/1 CA253 = 0.1	16.0	4.0	SAME	AS RUN	#60	---	-----	---	8	25	1920	4980	6.5 6.4 6.4 6.4	6.5 6.5 6.5 6.5	--- --- --- ---	6.5 6.5 6.5 6.5	12°	89.6	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time min	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
67	7-8		G																				Conducted at varying polymer dosages.
68	7-9	0.36	G	Alum = 3 CATFLOC T-1 = 2 mg/1 A23 = 100 ppb	16.7	4.2	1333 1078	248000 200000	3.1 3.1	---	-----	---	17	22	4284	5677	6.7 6.5 6.6 6.6	6.5 6.6 6.6 6.5	--- --- --- ---	6.6 6.5 6.5 6.5	12.5°	95.3	
69	7-10	0.36	G	Alum = 3 CATFLOC T-1 = 2 mg/1 A23 = 300 ppb	16.4	4.1	SAME	AS RUN	#68	---	-----	---	18	21	4428	5555	6.6 6.5 6.6 6.6	6.5 6.5 6.5 6.5	--- --- --- ---	6.5 6.5 6.4 6.5	12.5°	95.5	
70	7-12	0.33	G	Alum = 3 CATFLOC T-1 = 2 mg/1 A23 = 300 ppb	16.4	4.1	SAME	AS RUN	#68	---	-----	---	17	21	4182	5534	6.7 6.3 6.7	6.7 6.4 6.4	--- --- ---	6.7 6.4 6.6	12°	95.2	Asbestos run.
71	7-17	0.35	G	Alum = 3 573C = 2	16.3	4.1	SAME	AS RUN	#68	---	-----	---	19	22	4674	5574	6.6 6.5 6.6 6.6	6.5 6.5 6.5 6.5	--- --- --- ---	6.5 6.5 6.5 6.5	12°	95.7	
72 and 73	7-18 to 7-19		G				SAME	AS RUN	#68														Conducted under varying condition to determine 573C dosage.
74	7-23	0.30	G	Alum = 3 573C = 2	16.2	4.0	SAME	AS RUN	#68	---	-----	---	0	15	0	0	6.6 6.6	6.5 6.5	--- ---	6.5 6.4	12°	0	High turbidity probably due to malfunction in cationic polymer pump.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^3}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
75	7-30	0.35	G	Alum = 3 573C = 2 CA233 = 100 ppb	16.3	4.1	1333 1078	247938 200508	3.1 min 3.1 min	---	-----	---	0	15.5	0	0	6.7 6.5 6.6	6.6 6.5 6.6	--- --- ---	6.6 6.5 6.5	13°	0	
76	7-31	0.34	G	Alum = 3 573C = 2 CA233 = 200 ppb	16.4	4.1	SAME	AS RUN	#75	---	-----	---	17	17	4182	5534	6.6 6.5 6.4	6.6 6.6 6.5	--- --- ---	6.6 6.6 6.5	13°	95.2	
77	8-1	0.34	G	Alum = 3 573C = 2 CA233 = 300 ppb	16.5	4.1	SAME	AS RUN	#75	---	-----	---	0	14	0	0	6.7 6.6 6.6	6.6 6.6 6.6	--- --- ---	6.6 6.6 6.6	13°	0	
78	8-2	0.33	G	Alum = 3 573C = 2 1986N = 100 ppb	15.8	4.0	SAME	AS RUN	#75	---	-----	---	0 see comment	15	0	0	6.7 6.7 6.7	6.7 6.7 6.7	--- --- ---	6.7 6.7 6.6	13°	0	Turbidity remained at 0.11 NTU for entire run
79	8-3	0.35	G	Alum = 3 573C = 2 1986N = 200 ppb	16.5	4.1	SAME	AS RUN	#75	---	-----	---	0 see comment	14	0	0	6.6 6.5 6.5	6.6 6.4 6.4	--- --- ---	6.6 6.4 6.4	13°	0	Turbidity remained at 0.11 NTU for entire run.
80	8-14	0.31	B	Alum = 3 CATFLOC T-1 = 2 mg/l CA253 = 0.1	16.0	4.0	1443 1443 1443	1324 1324 1324	0.92 0.92 0.92				0	17	0	0	6.5 6.5 6.6	6.5 6.5 6.6	--- --- ---	6.4 6.4 6.6	14°	0	
80 MM	8-14	0.31	B	Alum = 3 CATFLOC T-1 = 2 mg/l CA253 = 0.1	0.44	4.0	SAME	AS RUN	#80	---	-----	---	0	20	0	0	SAME AS RUN #80				14°	0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF %	COMMENTS
							G sec⁻¹	GT	Time sec	G sec⁻¹	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft² run	Net Water Produced gal/ft² 24 hr	Raw	RM	Floc	Fin			
81	8-16	0.31	M	Alum = 3 CATFLOC T-1 = 2 mg/l CA 233 = 0.1	16.0	4.0	1443	1324	0.92	---	-----	---	11	11	2640	5193	6.7 6.6	6.6 6.5	--- ---	6.6 6.5	14°	92.4	
							1443	1324	0.92														
81 M	8-16	0.31	M	SAME AS RUN #81	0.44	4.0	SAME	AS RUN	#81	---	-----	---	18	22	4320	5413	SAME AS RUN #81				14°	95.4	
82	8-18	0.31	M	Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.3	15.8	4.0	SAME	AS RUN	#81				12	12	2880	5240	6.4	6.2	---	6.2	14°	93.0	
82 M	8-18	0.31	M	SAME AS RUN #82	0.44	4.0	SAME	AS RUN	#81				26	26	6240	5520	SAME AS RUN #82				14°	96.8	
83	8-20	0.32	C	Alum = 10 Lime = 4.0 1986N = 0.07	15.0	3.8	1443	1324	0.92	---	-----	---	9	9	2052	5067	6.7 6.7	6.4 6.4	--- ---	6.4 6.4	14°	90.2	
83 M	8-20	0.32	C	SAME AS RUN #83	0.44	4.0	SAME	AS RUN	#83	---	-----	---	21	23	5040	5463	SAME AS RUN #83				14°	96.0	
84	8-22	0.32	C	SAME AS RUN #83	16.0	4.0	SAME	AS RUN	#83	---	-----	---	10	23	2400	5136	6.5 6.6	6.4 6.3	--- ---	6.4 6.4	13.5	91.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
84 M	8-22	0.72	C	Alum = 10 Lime = 4.1 1986N = 0.07	0.66	6.0	1443	1324	.92				10	10	3600	7944	6.5 6.6	6.4 6.3	--- ---	6.4 6.4	13.5°	94.4	
85	8-23	0.33	C	SAME AS RUN #84M	16.3	4.1	SAME	AS RUN	#84M					6	1440	5136	6.7	6.4	---	6.4	13.5°	86.1	
85 M	8-23	0.33	C	SAME AS RUN #84M	0.88	8.0	SAME	AS RUN	#85				6	6	2880	10240	SAME AS RUN #85				13.5°	93.1	
86	8-29	0.35	C	SAME AS RUN #84M	15.9	4.0	SAME	AS RUN	#84M				11	11	2640	5193	6.6 6.6 6.5	6.4 6.3 6.3	--- --- ---	6.4 6.4 6.4	13°	92.4	
86 M	8-29	0.35	C	SAME AS RUN #84M	0.67	6.1	SAME	AS RUN	#86				11	11	4026	8113	SAME AS RUN #86				13°	95.0	
87	8-30	0.35	C	SAME AS RUN #84M	15.7	3.9	SAME	AS RUN	#84M				12	12	2808	5099	6.7 6.6	6.4 6.4	--- ---	6.4 6.4	13°	92.9	
87 M	8-30	0.35	C	SAME AS RUN #84M	0.68	6.2	SAME	AS RUN	#87				11	12	4092	8342	SAME AS RUN #87				13°	95.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
88	8-31	0.35	C	Alum = 10 Lime	16.1	4.0	1443	1324	0.92				12	12	2800	5240	6.7 6.6 6.6	6.4 6.4 6.4	--- --- ---	6.4 6.4 6.4	13°	93.1	
88 M	8-31	0.35	C	SAME AS RUN #88	0.68	6.2							13	14	4836	8387	SAME AS RUN #88				13°	95.9	
89	9-2	0.32	C	Alum = 10 Lime 1986N = 0.07	16.0	4.0	1440	1370	0.9				11	11	2160	5067	6.5 6.6	6.4 6.4	--- ---	6.4 6.4	13°	90.7	Asbestos run.
89 MM	9-2	0.32	C	SAME AS RUN #89	0.44	4.0	SAME AS RUN #89						20	20	4800	5448	SAME AS RUN #89				13°	95.8	Asbestos run.
89B	9-3	0.32	M	Alum = 3 CATFLOC T-1 = 2 mg/l A23 = 0.1	16.0	4.0	1440 1440	1370 1370	0.9 0.9				11	16	2160	5067	6.7	6.7	---	6.6	13°	90.7	
89B MM	9-3	0.32	M	SAME AS RUN #89B	0.44	4.0	SAME AS RUN #89B						24	34 to 7.5' headloss	5760	5900	SAME AS RUN #89				13°	96.5	
90	9-5	0.35	M	SAME AS RUN #89B	16.0	4.0	1443 1443	1324 1324	0.92 0.92				16	16	3840	5370	6.7 6.7 6.6	6.6 6.5 6.5	--- --- ---	6.6 6.6 6.5	14°	94.8	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
90 M	9-5	0.35	A	Alum = 3 CATFLOC T-1 = 2 mg/1 A23 = 0.1	0.66	6.0	1443 1443	1324 1324	0.92 0.92				18	18	6480	8253	6.7 6.7 6.6	6.6 6.5 6.5	--- --- ---	6.6 6.6 6.5	14°	96.9	
91	9-7	0.35	M	SAME AS RUN #90M	16.0	4.0	SAME	AS RUN	#90M				16	17	3840	5370	6.7 6.6 6.5	6.7 6.7 6.5	--- --- ---	6.7 6.7 6.5	14°	94.8	
91 M	9-7	0.35	M	SAME AS RUN #90M	0.88	8.0	SAME	AS RUN	#90M				5	11	2400	9984	SAME	AS RUN	#91		14°	91.7	
92	10-3	0.38	D	Alum = 10 Lime = 4.1 A23 = 0.1	16.0	4.0	1443	1324	0.92	69.7	40400	9.6	17	17	4080	5393	6.5 6.7 6.8 6.7	6.6 6.5 6.7 6.6	6.7 6.5 6.7 6.6	6.6 6.5 6.7 6.6	14°	95.1	
92 M	10-3	0.38	D	SAME AS RUN #92	0.44	4.0	SAME	AS RUN	#92				21	21	5040	5463	SAME	AS RUN	#92		14°	96.0	
93	10-5	0.38	D	Alum = 10 Lime = 3.3 A23 = 0.07	16.0	4.0	SAME	AS RUN	#92				9	12	2160	5067	7.0 6.9 6.9	6.7 6.7 6.7	6.7 6.7 6.7	6.8 6.7 6.7	14°	90.7	Asbestos run.
93 M	10-16	0.39	D	SAME AS RUN #93	0.44	4.0	SAME	AS RUN	#92				16	19	3840	5370	SAME	AS RUN	#93		14°	94.8	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
94	10-11	0.39	D	Alum = 10 Lime = 3.3 A23 = 0.1	16.0	4.0	1443	1324	0.92	69.7	40400	9.6	9	11	2160	5067	6.7 6.7	6.4 6.5	6.4 6.4	6.5 6.5	13°	90.7	
94 M	10-11	0.39	D	SAME AS RUN #94	0.44	4.0	SAME AS RUN #94						18	18	4320	5413	SAME AS RUN #94				13°	95.4	
95	10-12	0.39	D	SAME AS RUN #94	16.0	4.0	SAME AS RUN #94						12	12	2880	5240	6.6 6.7 6.6	6.4 6.4 6.4	6.4 6.4 6.3	6.4 6.5 6.5	13°	93.1	
95 M	10-12	0.39	D	SAME AS RUN #94	0.66	6.0	SAME AS RUN #94						11	11	3960	8007	SAME AS RUN #95				13°	95.0	
96	10-16	0.39	D	SAME AS RUN #94	16.0	4.0	SAME AS RUN #94						11	11	2640	5193	6.7 6.7	6.5 6.5	6.5 6.5	6.7 6.6	13°	92.4	
96 M	10-16	0.39	D	SAME AS RUN #94	0.88	8.0	SAME AS RUN #94						6	6	2880	10240	SAME AS RUN #96				13°	93.1	
97	10-17	.40	D	SAME AS RUN #94	16.0	4.0	1443	1324	0.92	28.6	16600	9.6	11	11	2160	5067	6.6 6.6	6.5 6.5	6.6 6.5	6.6 6.6	13°	90.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
97 M	10-17	0.40	D	Alum = 10 Lime = 3.3 A23 = 0.1	0.44	4.0	1443	1324	0.92	29	16600	9.6	18	18	4320	5413	6.6 6.6	6.5 6.5	6.6 6.5	6.6 6.6	13°	95.4	
98	10-18	0.40	D	SAME AS RUN #97M	16.0	4.0	SAME	AS RUN	#97M				11	11	2160	5067	6.4	6.5	6.5	6.4	13°	90.7	
98 M	10-18	0.40	D	SAME AS RUN #97M	0.66	6.0	SAME	AS RUN	#97M				10	10	3600	7944	SAME AS RUN #98				13°	94.4	
99	10-19	0.40	D	SAME AS RUN #97M	16.0	4.0	SAME	AS RUN	#97M				12	12	2880	5240	6.7 6.7	6.7 6.7	6.8 6.7	6.8 6.8	13°	93.1	
99 M	10-19	0.40	D	SAME AS RUN #97M	0.88	8.0	SAME	AS RUN	#97M				6	7	2880	10240	SAME AS RUN #99				13°	93.1	
100	10-22	0.39	D	SAME AS RUN #97M	16.0	4.0	1443	1324	0.92	193	111000	9.6	12	12	2880	5240	6.9 6.9 6.7	6.7 6.7 6.5	6.7 6.7 6.5	6.7 6.7 6.6	12°	93.1	
100 M	10-22	0.39	D	SAME AS RUN #97M	0.44	4.0	SAME	AS RUN	#100				18	19	4320	5413	SAME AS RUN #100				12°	95.4	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ Hr}$	Raw	RM	Floc	Fin			
101	10-23	0.39	D	Alum = 10 Lime = 3.3 A23 = 0.1	16.0	4.0	1443	1324	0.92	193	111000	9.6	12	12	2880	5240	6.9 6.7	6.7 6.6	6.7 6.7	6.7 6.7	12.5°	93.1	
101 M	10-23	0.39	D	SAME AS RUN #101	0.66	6.0	SAME	AS RUN	#101				11	11	3960	8007	SAME	AS RUN	#101		12.5°	95.0	
102	10-24	0.40	D	SAME AS RUN #101	16.0	4.0	SAME	AS RUN	#101				13	13	4200	5280	6.9 6.8 6.8	6.7 6.7 6.5	6.7 6.7 6.5	6.7 6.7 6.5	13°	95.2	
102 M	10-24	0.40	D	SAME AS RUN #101	0.88	8.0	SAME	AS RUN	#101				6	6	2880	10240	SAME	AS RUN	#102		13°	93.1	
103	10-30	0.45	D	Alum = 8.5 Lime 1986N = 0.07	16.0	4.0	1443	1324	0.92	70	40400	9.6	13	13	4200	5280	6.8 6.8	6.7 6.7	6.6 6.6	6.7 6.6	12°	95.2	
103 M	10-30	0.45	D	SAME AS RUN #103	0.44	4.0	SAME	AS RUN	#103				17	21	4080	5314	SAME	AS RUN	#103		12°	95.1	
104	10-30	0.46	D	SAME AS RUN #103	16.0	4.0	SAME	AS RUN	#103				15	15	3600	5344	6.8 6.7 6.7	6.7 6.7 6.5	6.6 6.6 6.5	6.7 6.7 6.5	12°	94.4	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
104 M	10-30	0.46	D	Alum = 8.5 Lime = 3.3 1986N = 0.07	0.66	6.0	1443	1324	0.92	70	40400	9.6	12	12	4320	8060	6.8 6.7 6.7	6.7 6.7 6.5	6.6 6.6 6.5	6.7 6.7 6.5	12°	95.4	
105	11-1	0.48	D	SAME AS RUN #104M	16.0	4.0	SAME	AS RUN	#104				13	13	4200	5280	6.8 6.7 6.8	6.7 6.5 6.7	6.7 6. 5 6.7	6.7 6.5 6.7	11°	95.2	
105 M	11-1	0.48	D	SAME AS RUN #104M	0.88	8.0	SAME	AS RUN	#104				8	8	3840	10560	SAME AS RUN #105				11°	94.8	
106	11-5	0.60	D	SAME AS RUN #104M	16.0	4.0	1443	1324	0.92	28	16600	9.6	0	11	0	0	6.8 6.8	6.7 6.8	6.7 6.7	6.7 6.7	10°	0	
106 M	11-5	0.60	D	SAME AS RUN #104M	0.44	4.0	SAME	AS RUN	#106				5	20	1200	4512	SAME AS RUN #106				10°	83.3	
107	11-6	0.61	D	SAME AS RUN #104M	16.0	4.0	SAME	AS RUN	#106				7	19	1680	4869	6.8 6.7 6.7	6.7 6.7 6.6	6.7 6.7 6.5	6.6 6.6 6.5	10°	88.1	
107 M	11-6	0.61	D	SAME AS RUN #104M	.66	6.0	SAME	AS RUN	#106				3	14	1080	6320	SAME AS RUN #107				10°	81.5	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
108	11-7	0.70	D	Alum = 8.5 Lime = 2.9 1986N = 0.07	16.0	4.0	1443	1324	0.92	70	40400	9.6	18	18	4320	5413	6.9 6.8 6.8	6.9 6.8 6.7	6.8 6.7 6.7	6.8 6.7 6.7	10°	95.4	Asbestos run.
108 M	11-7	0.70	D	SAME AS RUN #108	0.55	5.0	SAME	AS RUN	#108				14	18	4200	6729	SAME AS RUN #108				10°	95.2	Asbestos run.
109	11-12	0.75	D	Alum = 3 CATFLOC T-1 = 2 mg/1 1986N = 0.1	16.0	4.0	SAME	AS RUN	#108				17	26	4080	5314	6.9 6.8 6.9 6.8	6.7 6.7 6.7 6.7	6.7 6.7 6.7 6.7	6.7 6.7 6.7 6.7	10°	95.1	
109 M	11-12	0.75	D	SAME AS RUN #109	0.66	6.0	SAME	AS RUN	#108				8	17	2880	7770	SAME AS RUN #109				10°	93.1	
110	11-13	0.80	D	Alum = 5 CATFLOC T-1 = 2 mg/1 1986N = 0.1	16.0	4.0	1440	1320	.92	70	40740	9.7	19	19 to 4' headloss	4560	5500	6.9 6.8 6.8	6.7 6.7 6.7	6.7 6.7 6.7	6.7 6.7 6.7	10°	95.6	
110 M	11-13	0.80	D	SAME AS RUN #110	0.66	6.0	SAME	AS RUN	#110				12	16	4298	8018	SAME AS RUN #110				10°	95.3	
111	11-16	0. 80	D	SAME AS RUN #110	16.0	4.0	1440	1320	.92	70	40740	9.7	22	22	5280	5476	6.8 6.9 6.9	6.7 6.7 6.8	6.7 6.7 6.7	6.7 6.7 6.7	10°	96.2	Asbestos run.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
111 M	11-16	0.80	D	Alum = 5 CATFLOC T-1 = 2 mg/l 1986N =0.1	0.55	5.0	1440	1320	.92	70	40740	9.7	17	19	5080	6783	6.8 6.9 6.9	6.7 6.7 6.8	6.7 6.7 6.7	6.7 6.7 6.7	10°	96.1	Asbestos run.
112	11-20	0.81	D	SAME AS RUN #111M	16.0	4.0	SAME	AS RUN	#111M				21	22	5040	5476	7.0 6.9 6.8 6.8	6.9 6.8 6.6 6.5	6.8 6.8 6.6 6.6	6.9 6.7 6.6 6.5	7.5°	96.0	
112 M	11-20	0.81	D	SAME AS RUN #111M	0.66	6.0	SAME	AS RUN	#111M				14	15	5040	8143	SAME	AS RUN	#112		7.5°	96.0	
113	12-21	4.8	D																				Varying conditions to determine ferric chloride dosage.
114	12-22	3.8	D																				SAME AS RUN #113
115	12-25	3.6	D	$FeCl_3$ = 15	16.0	4.0	SAME	AS RUN	#111M				0	19	0	0						0	
116	12-26	3.6	D	$FeCl_3$ = 6	16.0	4.0	SAME	AS RUN	#111M				0	15	0	0					4.5°	0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
117	1-2	3.2	D	$FeCl_3$ = 6	16.0	4.0	1440	1320	.92	70	40740	9.7	0	15	0	0					4.5°	0	
118	1-9	3.2	D	Alum = 10 Lime = 3.1 1986N = 0.07	16.0	4.0	SAME AS RUN #117						7	18	1680	4869	5.6 6.6 6.7	5.4 6.2 6.2	5.4 6.2 6.3	5.7 6.3 6.3	3°	88.1	
118 M	1-9	3.2	D	SAME AS RUN #118	0.55	5.0	SAME AS RUN #117						7	24	2092	6230	SAME AS RUN #118				3°	90.4	
119	1-10	3.1	D	Alum = 7 Lime = 2.5 1986N = 0.07	16.0	4.0	SAME AS RUN #117						0	22	0	0	6.6 6.6 6.5 6.5	6.4 6.4 6.4 6.4	6.7 6.4 6.4 6.4	6.5 6.4 6.4 6.4	4°	0	
19 M	1-10	3.1	D	SAME AS RUN #119	0.55	5.0	SAME AS RUN #117						0	37	0	0	SAME AS RUN #119				4°	0	
120	1-11	3.3	D	Alum = 10 Lime 1986N = 0.15	16.0	4.0	1440	1320	0.92	70	40740	9.7	13	13	3120	5240	6.7 6.7	6.5 6.5	6.5 6.5	6.6 6.6	4°	93.6	Asbestos run.
120 M	1-11	3.3	D	SAME AS RUN #120	0.44	4.0	SAME AS RUN #120						17	27	4070	5379	SAME AS RUN #120				4°	95.1	Asbestos run.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
121	1-15	2.6	D	Alum = 10 Lime = 3.3 1986N = 0.15	16.0	4.0	1440	1320	0.92	70	40740	9.7	9	10	2160	5067	6.7 6.7 6.5 6.7	6.5 6.5 6.2 6.6	6.4 6.4 6.3 6.4	6.4 6.4 6.4 6.5	5°	90.7	
121 M	1-15	2.6	D	SAME AS RUN #121	0.55	5.0	SAME	AS RUN	#121				15	24	4482	6732	SAME AS RUN #121				5°	95.5	
122	1-16	2.5	D	SAME AS RUN #121	16.0	4.0	SAME	AS RUN	#121				9	14	2160	5067	6.8 6.7 6.4	6.6 6.6 6.3	6.5 6.6 6.4	6.5 6.5 6.3	5°	90.7	Shut down at 6' headloss.
122 M	1-16	2.5	D	SAME AS RUN #121	0.66	6.0	SAME	AS RUN	#121				10	15	3582	7944	SAME AS RUN #122				5°	94.4	Shut down at 7.75' headloss
123	1-17	2.5	D	Alum = 10 Lime = 3.3 1986N = 0.25	16.0	4.0	SAME	AS RUN	#121				14	14	3360	5314	6.7 6.7	6.3 6.3	6.3 6.3	6.5 6.4	4°	94.1	
123 M	1-17	2.5	D	SAME AS RUN #123	Ave. = 0.64 Max. = 0.66	Ave. = 5.8 Max. = 6.0	SAME	AS RUN	#121				17	18	5905	7930	SAME AS RUN #123				4°	96.6	
124	1-22	2.3	D	SAME AS RUN #123	16.0	4.0	SAME	AS RUN	#121				14	14	3360	5314	6.6 6.6 6.3 6.7	6.3 6.2 6.1 6.3	6.3 6.3 6.1 6.3	6.6 6.6 6.0 6.3	5°	94.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
124 M	1-22	2.3	D	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.57 Max. = 0.66	Ave. = 5.2 Max. = 6.0	1440	1320	0.92	70	40740	9.7	21	21	6500	7100	6.6 6.6 6.3 6.7	6.3 6.2 6.1 6.3	6.3 6.3 6.1 6.3	6.6 6.6 6.0 6.3	5°	96.9	
125	1-23	2.3	D	SAME AS RUN #124M	16.0	4.0	SAME AS RUN #124M						13	17	3120	5280	6.6 6.4 6.7	6.6 6.8 6.4	6.5 6.2 6.2	6.6 6.2 6.4	5°	93.6	
125 M	1-23	2.3	D	SAME AS RUN #124M	Ave. = 0.49 Max. = 0.77	Ave. = 4.5 Max. = 7.0	SAME AS RUN #124M						19	24	5152	6171	SAME AS RUN #125				5°	96.1	
126	1-24	2.2	D	SAME AS RUN #124M	16.0	4.0	SAME AS RUN #124M						0	20	0	0	6.7 6.7 6.6	6.4 6.4 6.4	6.4 6.4 6.5	6.4 6.4 6.4	5°	0	
126 M	1-24	2.2	D	SAME AS RUN #124M	Ave. = 0.65 Max. = 0.89	Ave. = 5.9 Max. = 8.0	SAME AS RUN #124M						0	23	0	0	SAME AS RUN #126				5°	0	
127	1-29	2.1	D	SAME AS RUN #124M	16.0	4.0	SAME AS RUN #124M						11	15	2640	5192	6.9 6.9 6.4	6.7 6.7 6.5	6.5 6.6 6.4	6.4 6.4 6.4	5°	92.4	
127 M	1-29	2.1	D	SAME AS RUN #124M	Ave. = 0.74 Max. = 0.77	Ave. = 6.8 Max. = 7.0	SAME AS RUN #124M						10	14	4080	9072	SAME AS RUN #127				5°	95.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours <0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
128	1-29	2.0	D	Alum = 10 Lime = 3.3 1986N = 0.25	16.0	4.0	1440	1320	0.92	70	40740	9.7	13	13	3120	5280	6.7 6.6 6.6	6.6 6.6 6.3	6.6 6.6 6.4	6.4 6.5 6.5	5°	93.6	
128 M	1-29	2.0	D	SAME AS RUN #128	Ave. = 0.71 Max. = 0.88	Ave. = 6.5 Max. = 8.0	SAME AS RUN #128						16	16	6240	8914	SAME AS RUN #128				5°	96.8	Loading set at 8.0 gpm/ft² and allowed to drop off as run progressed.
129	1-30	1.9	D	SAME AS RUN #128	16.0	4.0	1440	1320	0.92	---	-----	---	0	14 to 4.0' headloss	0	0	6.8 6.7 6.8	6.7 6.6 6.7	--- --- ---	6.7 6.6 6.6	4°	0	
129 M	1-30	1.9	D	SAME AS RUN #128	0.67	6.1	SAME AS RUN #129						0	14 to 4.25' headloss	0	0	SAME AS RUN #129				4°	0	
130	1-31	1.8	D	SAME AS RUN #128	16.0	4.0	SAME AS RUN #129						9	14	2160	5067	6.7 6.7	6.5 6.4	--- ---	6.4 6.4	4°	90.7	
130 M	1-31	1.8	D	SAME AS RUN #128	0.66	6.0	SAME AS RUN #129						0	32	0	0	SAME AS RUN #130				4°	0	Turbidity > 0.1 NTU throughout run.
131	2-5	1.8	D	SAME AS RUN #128	16.0	4.0	SAME AS RUN #129						9	15	2160	5067	6.8 6.8 6.6 6.6	6.6 6.6 6.5 6.5	--- --- --- ---	6.4 6.4 6.4 6.5	5°	90.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
131 M	2-5	1.8	D	Alum = 10 Lime = 3.3 1986N = 0.25	0.44	4.0	1440	1320	0.92	---	-----	---	8	19	1915	4966	6.8 6.8 6.6 6.6	6.6 6.6 6.5 6.5	--- --- --- ---	6.4 6.4 6.4 6.5	5°	89.6	
132	2-6	1.7	D	SAME AS RUN #131M	16.0	4.0	SAME	AS RUN	#131M				9	14	2160	5067	6.7 6.6 6.6 6.7	6.6 6.6 6.5 6.5	--- --- --- ---	6.6 6.6 6.5 6.4	5°	90.7	
132 M	2-7	1.7	D	SAME AS RUN #131M	0.55	5.0	SAME	AS RUN	#131M				5	26	1500	5852	SAME AS RUN #132				5°	86.7	
133	2-7	1.8	D	SAME AS RUN #131M	16.0	4.0	SAME	AS RUN	#131M				10	18	2400	5136	6.7 6.7 6.8 6.8	6.6 6.6 6.7 6.7	--- --- --- ---	6.7 6.5 6.8 6.8	6°	91.7	
133 M	2-7	1.8	D	SAME AS RUN #131M	0.66	6.0	SAME	AS RUN	#131M				0	27	0	0	SAME AS RUN #133				6°	0	
134	2-12	1.7	D	SAME AS RUN #131M	16.0	4.0	1440	1320	0.92	70	40740	9.7	14	14	3360	5314	6.7 6.7 6.6 6.7	6.6 6.6 6.5 6.5	6.6 6.5 6.6 6.5	6.6 6.6 6.6 6.5	5°	94.1	
134 M	2-12	1.7	D	SAME AS RUN #131M	0.44	4.0	SAME	AS RUN	#134				25	26	5985	5496	SAME AS RUN #134				5°	96.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
135	2-14	1.6	D	Alum = 12 Lime = 3.3 1986N = 0.2	16.0	4.0	1440	1320	0.92	70	40740	9.7	14	15	3360	5314	6.7 6.6 6.7	6.6 6.6 6.2	6.6 6.6 6.2	6.5 6.5 6.2	5°	94.1	Asbestos run.
135 M	2-14	1.6	D	SAME AS RUN #135	0.44	4.0	SAME	AS RUN	#135				23	24	5506	5474	SAME	AS RUN	#135		5°	96.3	Asbestos run.
136	2-15	1.6	D	Alum = 10 Lime = 3.3 1986N = 0.2	16.0	4.0	SAME	AS RUN	#135				16	16	3840	5370	6.8 6.8 6.7	6.7 6.7 6.7	6.6 6.6 6.6	6.6 6.6 6.6	5°	94.8	
136 MM	2-15	1.6	D	SAME AS RUN #136	0.55	5.0	SAME	AS RUN	#135				16	16	4781	6759	SAME	AS RUN	#136		5°	95.8	
137	2-16	1.6	D	SAME AS RUN #136	16.0	4.0	SAME	AS RUN	#135				16	16	3840	5370	6.8 6.8 6.8	6.6 6.6 6.6	6.6 6.6 6.6	6.6 6.6 6.6	5°	94.8	
137 MM	2-16	1.6	D	SAME AS RUN #136	Ave. = 0.62 Max. = 0.66	Ave. = 5.6 Max. = 6.0	SAME	AS RUN	#135				22	23	7405	7768	SAME	AS RUN	#137		5°	97.3	
138	2-21	1.5	D	SAME AS RUN #136	16.0	4.0	SAME	AS RUN	#135				13	13	3120	5280	6.7 6.6	6.4 6.4	6.4 6.4	6.4 6.5	5°	93.6	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft² run	Net Water Produced gal/ft² 24 hr	Raw	RM	Floc	Fin			
138 MM	2-21	1.5	D	Alum = 10 Lime = 3.3 1986N = 0.2	Ave. = 0.73 Max. = 0.77	Ave. = 6.7 Max. = 7.0	1440	1320	0.92	70	40740	9.7	10	13	4020	8930	6.7 6.6	6.4 6.4	6.4 6.4	6.4 6.5	5°	95.0	
138 FC	2-21	1.5	D	SAME AS RUN #138M	Ave. = 0.71 Max. = 0.77	Ave. = 6.5 Max. = 7.0	SAME AS RUN #138M						12	13	4680	8760	SAME AS RUN #138M				5°	95.7	
139	2-23	1.4	D	Alum = 10 Lime = 3.3 1986N = 0.25	16.0	4.0	SAME AS RUN #138M						12	12	2880	5240	6.6 6.6	6.5 6.5	6.5 6.5	6.5 6.5	6°	93.1	
139 MM	2-23	1.4	D	SAME AS RUN #139	Ave. = 0.71 Max. = 0.77	Ave. = 6.5 Max. = 7.0	SAME AS RUN #138M						11	13	4303	8739	SAME AS RUN #139				6°	95.4	
139 FC	2-23	1.4	D	SAME AS RUN #139	Ave. = 0.71 Max. = 0.77	Ave. = 6.5 Max. = 7.0	SAME AS RUN #138M						10	10	3900	8640	SAME AS RUN #139				6°	94.9	
139 CC	2-23	1.4	D	SAME AS RUN #139	Ave. = 0.68 Max. = 0.77	Ave. = 6.2 Max. = 7.0	SAME AS RUN #138M						13	13	4875	8400	SAME AS RUN #139				6°	95.9	
140	2-25	1.4	D	Alum = 10 Lime = 3.3 1986N = 0.25	16.0	4.0	SAME AS RUN #138M						12	12	2880	5240	6.7 6.7 6.3	6.6 6.6 6.0	6.6 6.6 6.1	6.6 6.6 6.1	5°	93.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours <0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{Gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
140 MM	2-25	1.4	D	Alum = 10 Lime 1986N = 0.25	Ave. = 0.79 Max. = 0.88	Ave. = 7.2 Max. = 8.0	1440	1320	0.92	70	40740	9.7	12	12	5184	9440	6.7 6.7 6.3	6.6 6.6 6.0	6.6 6.6 6.1	6.6 6.6 6.1	5°	96.1	
140 FC	2-25	1.4	D	SAME AS RUN #140MM	Ave. = 0.81 Max. = 0.88	Ave. = 7.4 Max. = 8.0	SAME AS RUN #140MM						10	10	4440	9888	SAME AS RUN #140MM				5°	95.5	
140 CC	2-25	1.4	D	SAME AS RUN #140MM	Ave. = 0.80 Max. = 0.88	Ave. = 7.3 Max. = 8.0	SAME AS RUN #140MM						13	13	5690	9872	SAME AS RUN #140MM				5°	96.5	
141	2-27	1.4	D	SAME AS RUN #140MM	16.0	4.0	SAME AS RUN #140MM						12	12	2880	5240	6.7 6.7 6.4	6.6 6.5 6.3	6.6 6.4 6.3	6.6 6.4 6.3	5°	93.1	
141 MM	2-27	1.4	D	SAME AS RUN #140MM	Ave. = 0.65 Max. = 0.66	Ave. = 5.9 Max. = 6.0	SAME AS RUN #140MM						16	16	5568	7902	SAME AS RUN #141				5°	96.4	
141 FC	2-27	1.4	D	SAME AS RUN #140MM	Ave. = 0.62 Max. = 0.66	Ave. = 5.7 Max. = 6.0	SAME AS RUN #140MM						13	13	4446	7608	SAME AS RUN #141				5°	95.5	
141 CC	2-27	1.4	D	SAME AS RUN #140MM	0.66	6.0	SAME AS RUN #140MM						16	16	5760	8190	SAME AS RUN #141				5°	96.5	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
142	3-8	1.3	D	Alum = 10 Lime = 3.3 1986N = 0.25	16.0	4.0	1440	1320	0.92	70	40740	9.7	15	15	3600	5344	6.7 6.7 6.7 6.7	6.6 6.6 6.6 6.6	6.5 6.5 6.5 6.5	6.4 6.5 6.4 6.5	5°	94.4	
142 MM	3-8	1.3	D	SAME AS RUN #142	Ave. = 0.43 Max. = 0.44	Ave. = 3.9 Max. = 4.0	SAME	AS RUN	#142				26	26	6084	5356	SAME	AS RUN	#142		5°	96.7	
142 FC	3-8	1.3	D	SAME AS RUN #142	Ave. = 0.39 Max. = 0.44	Ave. = 3.6 Max. = 4.0	SAME	AS RUN	#142				26	26	5616	4928	SAME	AS RUN	#142		5°	96.4	
142 CC	3-8	1.3	D	SAME AS RUN #142	Ave. = 0.40 Max. = 0.44	Ave. = 3.7 Max. = 4.0	SAME	AS RUN	#142				24	26	5328	5068	SAME	AS RUN	#142		5°	96.2	
143	3-12	1.2	D	SAME AS RUN #142	16.0	4.0	SAME	AS RUN	#142				14	14	3360	5214	6.7 6.3 6.7	6.6 6.3 6.5	6.6 6.4 6.4	6.5 6.4 6.4	6.5°	94.1	
143 MM	3-12	1.2	D	SAME AS RUN #142	Ave. = 0.54 Max. = 0.56	Ave. = 4.9 Max. = 5.1	SAME	AS RUN	#142				8	22	2352	6236	SAME	AS RUN	#143		6.4°	91.5	
143 FC	2-27	1.4	D	SAME AS RUN #142	Ave. = 0.39 Max. = 0.56	Ave. = 3.6 Max. = 5.1	SAME	AS RUN	#142				20	33	4320	4879	6.7 6.7 6.4	6.6 6.5 6.3	6.6 6.4 6.3	6.6 6.4 6.3	5°	95.4	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
143 CC	2-27	1.4	D	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.51 Max. = 0.56	Ave. = 4.7 Max. = 5.1	1440	1320	0.92	70	40740	9.7	20	24	5640	6542	6.7 6.7 6.4	6.6 6.5 6.3	6.6 6.4 6.3	6.6 6.4 6.3	5°	96.4	
144	3-13	1.2	D	Alum = 3 CATFLOC T-1 = 2 mg/1 CA233 = 0.2	16.0	4.0	SAME AS RUN #143CC						19	20	4560	5432	6.6 6.5 6.7	6.2 6.1 6.4	6.2 6.1 6.4	6.4 6.1 6.4	5.5°	95.6	
144 MM	3-13	1.2	D	SAME AS RUN #144	Ave. = 0.42 Max. = 0.44	Ave. = 3.8 Max. = 4.0	SAME AS RUN #143CC						30	31	6840	5266	SAME AS RUN #144				5.5°	97.1	
144 FC	3-13	1.2	D	SAME AS RUN #144	Ave. = 0.37 Max. = 0.44	Ave. = 3.4 Max. = 4.0	SAME AS RUN #143CC						31	32	6324	4700	SAME AS RUN #144				5.5°	96.8	
144 CC	3-13	1.2	D	SAME AS RUN #144	Ave. = 0.37 Max. = 0.44	Ave. = 3.5 Max. = 4.0	SAME AS RUN #143CC						32	32	6720	4851	SAME AS RUN #144				5.5°	97.0	
145	3-19	1.1	D	SAME AS RUN #144	16.0	4.0	SAME AS RUN #143CC						12	12	2880	5240	6.6 6.5 6.7	6.6 6.6 6.6	6.5 6.6 6.6	6.5 6.5 6.5	7°	93.1	
145 MM	3-19	1.1	D	SAME AS RUN #144	Ave. = 0.59 Max. = 0.66	Ave. = 5.4 Max. = 6.0	SAME AS RUN #143CC						16	28	5184	7355	SAME AS RUN #145				7°	96.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
145 FC	3-19	1.1	D	Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.2	Ave. = 0.49 . Max. = 0.66	Ave. = 4.5 Max. = 6.0	1440	1320	0.92	70	40740	9.7	25	25	6750	6223	6.6 6.5 6.7	6.6 6.6 6.6	6.5 6.6 6.6	6.5 6.5 6.5	7°	97.0	
145 CC	3-19	1.1	D	SAME AS RUN #145FC	Ave. = 0.52 Max. = 0.66	Ave. = 4.7 Max. = 6.0	SAME	AS RUN	#145FC				25	26	7050	6508	SAME AS RUN #145FC				7°	97.2	
146	3-21	1.0	D	SAME AS RUN #145FC	16.0	4.0	SAME	AS RUN	#145FC				8	13	1915	5966	6.7 6.7	6.6 6.5	6.6 6.5	6.5 6.5	7°	89.6	
146 MM	3-21	1.0	D	SAME AS RUN #145FC	0.89		SAME	AS RUN	#145FC				see comments				SAME AS RUN #146				7°		Insufficient data due to chemicals running out
146 FC	3-21	1.0	D	SAME AS RUN #145FC	0.89		SAME	AS RUN	#145FC				see comments				SAME AS RUN #146				7°		SAME AS RUN #146 MM.
146 CC	3-21	1.0	D	SAME AS RUN #145FC	0.89		SAME	AS RUN	#145FC				see comments				SAME AS RUN #146				7°		SAME AS RUN #146 MM.
147	3-27	0.98	D	SAME AS RUN #145FC	16.0	4.0	SAME	AS RUN	#145FC				11	12	2640	5192	6.9 6.8	6.5 6.4	6.5 6.4	6.5 6.5	7°	92.4	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING gpm/ft²	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec⁻¹	GT	Time sec	G sec⁻¹	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV gal/ft² run	Net Water Produced gal/ft² 24 Hr	Raw	RM	Floc	Fin			
147 MM	3-27	0.98	D	Alum = 3 CATFLOC T-1 = 2 mg/l CA233 = 0.2	Ave. = 0.85 Max. = 0.89	Ave. = 7.7 Max. = 8.1	1440	1320	0.92	70	40740	9.7	13	22	6060	10520	6.9 6.8	6.5 6.4	6.5 6.4	6.5 6.5	7°	96.7	
147 FC	3-27	0.98	D	SAME AS RUN #147MM	Ave. = 0.70 Max. = 0.89	Ave. = 6.3 Max. = 8.1	SAME AS RUN #147MM						16	18	6048	8630	SAME AS RUN #147MM				7°	96.7	
147 CC	3-27	0.98	D	SAME AS RUN #147MM	Ave. = 0.67 Max. = 0.89	Ave. = 6.1 Max. = 8.1	SAME AS RUN #147MM						21	22	7686	8451	SAME AS RUN #147MM				7°	97.4	
148	3-29	0.95	D	SAME AS RUN #147MM	16.0	4.0	SAME AS RUN #147MM						14	14	3360	5314	6.7 6.7 6.7	6.6 6.6 6.6	6.5 6.5 6.5	6.5 6.5 6.5	6°	94.1	
148 MM	3-29	0.95	D	SAME AS RUN #147MM	0.79	7.2	SAME AS RUN #147MM.						0	20	0	0	SAME AS RUN #148				6°	0	
148 FC	3-29	0.95	D	SAME AS RUN #147MM	0.79	7.2	SAME AS RUN #147MM						0	14	0	0	SAME AS RUN #148				6°	0	
148 CC	3-29	0.95	D	SAME AS RUN #147MM	0.79	7.2	SAME AS RUN #147MM						0	18	0	0	SAME AS RUN #148				6°	0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
149	4-7	0.8 to 15	D	Alum = 10 Lime 1986N = 0.25	16.0	4.0	1440	1320	0.92	70	40740	9.7	5 hr ≤0.5	5	1200	4512	6/6	6.7	6.7	6.6	6°	83.3	High turbidity runs
150	4-12	4.0 to 13	D	SAME AS RUN #149	16.0	4.0	SAME	AS RUN	#149				7 hr ≤0.5	7	1680	4869	7.2 7.2	7.0 7.6	7.0 7.0	7.0 7.0	8.5°	88.1	High turbidity runs.
151	4-14	5.0	D	SAME AS RUN #149	8.8	2.2	SAME	AS RUN	#149				8 hr ≤0.5	8	924	2469	6.5	6.6	6.4	6.5	8.5°	78.4	High turbidity run.
151 MM	4-14	5.0	D	SAME AS RUN #149	0.43	3.9	SAME	AS RUN	#149				7 hr ≤0.5	12	1655	4785	SAME	AS RUN	#151		8.5°	87.9	High turbidity run.
151 FC	4-14	5.0	D	SAME AS RUN #149	0.46	4.2	SAME	AS RUN	#149				7 hr ≤0.5	10	1743	5077	SAME	AS RUN	#151		8.5°	88.5	High turbidity run.
151 CC	4-14	5.0	D	SAME AS RUN #149	0.45	4.1	SAME	AS RUN	#149				10 hr ≤0.5	10	2442	5234	SAME	AS RUN	#151		8.5°	91.8	High turbidity run.
152	4-21	5.7	D	SAME AS RUN #149	16.0	4.0	SAME	AS RUN	#149				10	16	2400	5136	6.5 6.5 6.5	6.6 6.6 6.6	6.5 6.5 6.6	6.5 6.5 6.5	8.5°	91.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
152 MM	4-21	0.57	D	Alum = 10 Lime 1986N = 0.25	0.44	4.0	1440	1320	0.92	70	40470	9.7	0	29	0	0	6.5 6.5 6.5	6.6 6.6 6.6	6.5 6.5 6.6	6.5 6.5 6.5	8.5°	0	
152 FC	4-21	0.57	D	SAME AS RUN #152MM	0.44	4.0	SAME	AS RUN	#152MM				0	24	0	0	SAME	AS RUN	#152MM		8.5°	0	
152 CC	4-21	0.57	D	SAME AS RUN #152MM	0.44	4.0	SAME	AS RUN	#152MM				0	24	0	0	SAME	AS RUN	#152MM		8.5°	0	
153	4-24	0.55	D	SAME AS RUN #152MM	16.0	4.0	SAME	AS RUN	#152MM				10	10	2400	5136	6.7 6.6 6.6	6.6 6.6 6.7	6.6 6.5 6.5	6.5 6.5 6.5	8.5°	91.7	
153 MM	4-24	0.55	D	SAME AS RUN #152MM	Ave. = 0.80 Max. = 1.1	Ave. = 7.3 Max. = 10.0	SAME	AS RUN	#152MM				12	13	5256	9893	SAME	AS RUN	#153		8.5°	96.2	
153 FC	4-24	0.55	D	SAME AS RUN #152MM	Ave. = 0.74 Max. = 1.1	Ave. = 6.8 Max. = 10.0	SAME	AS RUN	#152MM				14	14	5712	9248	SAME	AS RUN	#153		8.5°	96.5	
153 CC	4-24	0.55	D	SAME AS RUN #152MM	Ave. = 0.66 Max. = 1.1	Ave. = 6.0 Max. = 10.0	SAME	AS RUN	#152MM				14	14	5040	8143	SAME	AS RUN	#153		8.5°	96.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
154	4-28	6.0	D	Alum = 10 Lime 1986N = 0.25	16.0	4.0	1440	1320	0.92	70	40470	9.7	10 ≤0.5	10	2400	5136	6.5	6.6	6.6	6.6	8.5°	91.7	High turbidity run.
154 MM	4-28	6.0	D	SAME AS RUN #154	0.44	4.0	SAME	AS RUN	#154				10 ≤0.5	15	2400	5136	SAME	AS RUN	#154		8.5°	91.7	High turbidity run.
154 FC	4-28	6.0	D	SAME AS RUN #154	0.43	3.9	SAME	AS RUN	#154				10 ≤0.5	12	2352	5024	SAME	AS RUN	#154		8.5°	91.5	High turbidity run.
154 CC	4-28	6.0	D	SAME AS RUN #154	0.44	4.0	SAME	AS RUN	#154				12 ≤0.5	13	2851	5184	SAME	AS RUN	#154		8.5°	93.0	High turbidity run.
155	5-1	0.5	D	SAME AS RUN #154	16.0	4.0	SAME	AS RUN	#154				12	12	2880	5240	6.7 6.7 6.8	6.6 6.6 6.6	6.6 6.6 6.7	6.5 6.5 6.6	10°	93.1	
155 MM	5-1	0.5	D	SAME AS RUN #154	Ave. = 6.9 Max. = 1.1	Ave. = 6.3 Max. = 10.0	SAME	AS RUN	#154				0	22	0	0	SAME	AS RUN	#155		10°	0	
155 FC	5-1	0.5	D	SAME AS RUN #154	Ave. = 0.68 Max. = 1.1	Ave. = 6.2 Max. = 10.0	SAME	AS RUN	#154				3	24	1116	6584	SAME	AS RUN	#155		10°	82.1	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
155 CC	5-1	0.5	D	Alum = 10 Lime 1986N = 0.25	Ave. = 0.71 Max. = 1.1	Ave. = 6.5 Max. = 10.0	1440	132	0.92	70	40470	9.7	0	22	0	0	6.7 6.7 6.8	6.6 6.6 6.6	6.6 6.6 6.7	6.5 6.5 6.6	10°	0	
156	5-3	0.45	D	SAME AS RUN #155CC	16	4.0	SAME AS RUN #155CC						8	8	1915	4966	6.8 6.8	6.7 6.7	6.7 6.7	6.6 6.6	8.5°	89.6	
156 MM	5-3	0.45	D	SAME AS RUN #155CC	Ave. = 0.76 Max. = 1.1	Ave. = 6.9 Max. = 10.0	SAME AS RUN #155CC						14	14	5796	9390	SAME AS RUN #156				8.5°	96.5	
156 FC	5-3	0.45	D	SAME AS RUN #155CC	Ave. = 0.78 Max. = 1.1	Ave. = 7.1 Max. = 10.0	SAME AS RUN #155CC						14	14	5964	9672	SAME AS RUN #156				8.5°	96.6	
156 CC	5-3	0.45	D	SAME AS RUN #155CC	Ave. = 0.72 Max. = 1.1	Ave. = 6.6 Max. = 10.0	SAME AS RUN #155CC						14 to 9.2' headloss	14	5544	8966	SAME AS RUN #156				8.5°	96.4	
157	5-14	0.40	D	SAME AS RUN #155CC	16.0	4.0	SAME AS RUN #155CC						11	11	2640	5192	6.5 6.7 6.7	6.3 6.5 6.6	6.3 6.4 6.5	6.3 6.4 6.5	11°	92.4	
157 MM	5-14	0.40	D	SAME AS RUN #155CC	Ave. = 6.9 Max. = 1.1	Ave. = 6.3 Max. = 10.0	SAME AS RUN #155CC						16	16	6048	8630	SAME AS RUN #156				11°	96.7	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
157 FC	5-14	0.40	D	Alum = 10 Lime 1986N = 0.25	Ave. = 5.7 Max. = 1.1	Ave. = 5.2 Max. = 10.0	1440	1320	0.92	70	40470	9.7	20	20	6240	6860	6.5 6.7 6.7	6.3 6.5 6.6	6.3 6.4 6.5	6.3 6.4 6.5	11°	96.8	
157 CC	5-14	0 40	D	SAME AS RUN #157FC	Ave. = 0.44 Max. = 1.1	Ave. = 4.0 Max. = 10.0	SAME AS RUN #157FC						28	28	6720	5537	SAME AS RUN #157FC				11°	97.0	
158																							No Run #158
159	5-20	5.0	D	SAME AS RUN #157FC	16.0	4.0	SAME AS RUN #157FC						8 ≤0.5	8	1920	4980	6.5	6.6	6.6	6.6	10.5°	89.6	High turbidity run.
160	5-24	14 to 34	D	SAME AS RUN #157FC	16.0	4.0	SAME AS RUN #157FC						7 ≤0.5	7	1680	4869	6.6	6.6	6.6	6.8	13°	88.1	High turbidity run.
160 MM	5-24	14 to 34	D	SAME AS RUN #157FC	0.43	3.9	SAME AS RUN #147FC						9 ≤0.5	10	2101	4913	SAME AS RUN #160				13°	90.5	High turbidity run
160 FC	5-24	14 to 34	D	SAME AS RUN #157FC	0.43	3.9	SAME AS RUN #157FC						9 ≤0.5	10	2117	4955	SAME AS RUN #160				13°	90.6	High turbidity run.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
160 CC	5-24	14 to 34	D	Alum = 10 Lime 1986N = 0.25	0.43	3.9	1440	1320	0.92	70	40470	9.7	9 0.5	10	2095	4899	6.6	6.6	6.6	6.8	13°	90.5	High turbidity run.
161	6-8	0.30	D	SAME AS RUN #160CC	16.0	4.0	SAME	AS RUN	#160CC				11	11	2640	5192	6.5 6.5	6.4 6.3	6.4 6.4	6.5 6.5	12°	92.4	Asbestos run.
161 MM	6-8	0.30	D	SAME AS RUN #160CC	Ave. = 0.73 Max. = 1.1	Ave. = 6.7 Max. = 10.0	SAME	AS RUN	#160CC				16	16	6432	9197	SAME AS RUN #161				12°	96.9	Asbestos run.
161 FC	6-8	0.30	D	SAME AS RUN #160CC	Ave. = 0.71 Max. = 1.1	Ave. = 6.5 Max. = 10.0	SAME	AS RUN	#160CC				15	15	5850	8408	SAME AS RUN #161				12°	96.6	Asbestos run.
161 CC	6-8	0.30	D	SAME AS RUN #160CC	Ave. = 6.7 Max. = 1.1	Ave. = 6.1 Max. = 10.0	SAME	AS RUN	#160CC				16	16	5856	7909	SAME AS RUN #161				12°	96.6	Asbestos run.
162	6-10	5 to 34	D	SAME AS RUN #160CC	16.0	4.0	SAME	AS RUN	#160CC				0 ≤0.5	2	0	0	6.6	6.6	6.8	6.6	13°	0	High turbidity run.
162 MM	6-10	18 to 34	D	SAME AS RUN #160CC	Ave. = 0.53 Max. = 0.56	Ave. = 4.8 Max. = 5.1	SAME	AS RUN	#160CC				1 ≤0.5	4	290	416	SAME AS RUN #162				13°	31.0	High turbidity run.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
162 FC	6-10	18 to 34	D	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.46 Max. = 0.56	Ave. = 4.2 Max. = 5.1	1440	1320	0.92	70	40470	9.7	0 ≤0.5	2	0	0	6.6	6.6	6.8	6.6	13°	0	High turbidity run.
162 CC	6-10	18 to 34	D	SAME AS RUN #162FC	Ave. = 0.44 Max. = 0.56	Ave. = 4.0 Max. = 5.1	SAME AS RUN #162FC						3 ≤0.5	5	718	3667	SAME AS RUN #162FC				13°	72.0	High turbidity run.
163	6-11	18 to 34	D	SAME AS RUN #162FC	16.0	4.0	SAME AS RUN #162FC						1 ≤0.5	2	240	0	6.7	6.8	6.6	6.7	13.1°	16.7	High turbidity run.
163 MM	6-11	18 to 34	D	SAME AS RUN #162FC	Ave. = 0.48 Max. = 0.56	Ave. = 4.3 Max. = 5.1	SAME AS RUN #162FC						4 ≤0.5	4	1039	4646	SAME AS RUN #163				13.1°	80.8	High turbidity run.
163 FC	6-11	18 to 34	D	SAME AS RUN #162FC	Ave. = 0.38 Max. = 0.56	Ave. = 3.4 Max. = 5.1	SAME AS RUN #162FC						3 ≤0.5	3	617	2928	SAME AS RUN #163				13.1°	67.6	High turbidity run.
163 CC	6-11	18 to 34	D	SAME AS RUN #162FC	Ave. = 0.45 Max. = 0.56	Ave. = 4.1 Max. = 5.1	SAME AS RUN #162FC						5 ≤0.5	5	1239	4690	SAME AS RUN #163				13.1°	83.9	High turbidity run.
164 to 167																							No runs conducted.

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
168	7-26	0.25	H	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.42 Max. = 0.45	Ave. = 3.8 Max. = 4.0	1440	1320	0.92	70	40470	9.7	7	26	1596	4591					13°	87.5	
168 MM	7-26	0.25	H	SAME AS RUN #168	Ave. = 0.36 Max. = 0.44	Ave. = 3.3 Max. = 4.0	SAME	AS RUN	#168				10	26	1980	4153					13°	89.9	
168 FC	7-26	0.25	H	SAME AS RUN #168	Ave. = 0.40 Max. = 0.44	Ave. = 3.6 Max. = 4.0	SAME	AS RUN	#168				6	26	1296	4444					13°	84.6	
168 CC	7-26	0.25	H	SAME AS RUN #168	Ave. = 0.40 Max. = 0.44	Ave. = 3.6 Max. = 4.0	SAME	AS RUN	#168				6	26	1296	4444					13°	84.6	
169	8-10	0.25	H	SAME AS RUN #168	16.0	4.0	SAME	AS RUN	#168				8	8	1915	4966						89.6	
169 MM	8-10	0.25	H	SAME AS RUN #168	0.55	5.0	SAME	AS RUN	#168				14	14	4200	6729						95.2	
169 FC	8-10	0.25	H	SAME AS RUN #168	Ave. = 0.50 Max. = 0.55	Ave. = 4.6 Max. = 5.0	SAME	AS RUN	#168				14	14	3864	6163						94.8	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
169 CC	8-10	0.25	H	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.50 Max. = 0.55	Ave. = 4.6 Max. = 5.0	1440	1320	0.92	70	40470	9.7	14	14	3864	6163						94.8	
170	8-14	0.28	H	SAME AS RUN #169CC	16.0	4.0	SAME	AS RUN	#169CC				12	12	2880	5240						93.1	
170 MM	8-14	0.28	H	SAME AS RUN #169CC	0.66	6.0	SAME	AS RUN	#169CC				0	12	0	0						0	
170 FC	8-14	0.28	H	SAME AS RUN #169CC	Ave. = 0.61 Max. = 0.66	Ave. = 5.5 Max. = 6.0	SAME	AS RUN	#169CC				0	12	0	0						0	
170 CC	8-14	0.28	H	SAME AS RUN #169CC	Ave. = 0.61 Max. = 0.66	Ave. = 5.5 Max. = 6.0	SAME	AS RUN	#169CC				0	12	0	0						0	
171	8-16	0.30	H	SAME AS RUN #169CC	16.0	4.0	SAME	AS RUN	#169CC				12	12	2880	5240						93.1	
171 MM	8-16	0.30	H	SAME AS RUN #169CC	0.77	7.0	SAME	AS RUN	#169CC				0	16	0	0						0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENT
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
171 FC	8-16	0.30	H	Alum = 10 Lime = 3.3 1986N = 0.25	Ave. = 0.69 Max. = 0.78	Ave. = 6.3 Max. = 7.0	1440	1320	0.92	70	40470	9.7	0	12	0	0						0	
171 CC	8-16	0.30	H	SAME AS RUN #171FC	Ave. = 0.69 Max. = 0.78	Ave. = 6.3 Max. = 7.0	SAME AS RUN #171FC						0	12	0	0						0	
172	8-21	0.28	H	SAME AS RUN #171FC	16.0	4.0	SAME AS RUN #171FC						12	13	2880	5240					13°	93.1	
172 MM	8-21	0.28	H	SAME AS RUN #171FC	Ave. = 0.77 Max. = 0.89	Ave. = 7.0 Max. = 8.0	SAME AS RUN #171FC						0	18	0	0					13°	0	
172 FC	8-21	0.28	H	SAME AS RUN #171FC	Ave. = 0.79 Max. = 0.89	Ave. = 7.2 Max. = 8.0	SAME AS RUN #171FC						0	8	0	0					13°	0	
172 CC	8-21	0.28	H	SAME AS RUN #171FC	Ave. = 0.76 Max. = 0.89	Ave. = 6.9 Max. = 8.0	SAME AS RUN #171FC						0	15	0	0					13°	0	
174	9-5	0.28	D	Alum = 10 Lime = 3.3 1986N = 0.20	15.4	3.8	1440	1320	0.92	70	40470	9.7	11	11	2508	4911	6.4 6.4	6.2 6.0	6.2 6.2	6.2 6.1	15°	92.0	

RUN	DATE	RAW TURB NTU	FLOW SCHEMATIC	CHEMICAL DOSAGES (mg/l)	PLANT FLOW gpm	FILTER LOADING $\frac{gpm}{ft^2}$	RAPID MIX			FLOC			FINISHED WATER				pH				TEMP °C	EFF. %	COMMENTS
							G sec^{-1}	GT	Time sec	G sec^{-1}	GT	Time min	Hours ≤0.1 NTU	Hours to 8' or 10' Headloss	UFRV $\frac{gal/ft^2}{run}$	Net Water Produced $\frac{gal/ft^2}{24\ hr}$	Raw	RM	Floc	Fin			
174 MM	9-5	0.28	D	Alum = 10 Lime = 3.1 1986N = 0.20	Ave. = 0.72 Max. = 1.1	Ave. = 6.6 Max. = 10.0	1440	1320	0.92	70	40470	9.7	18	18	7128	9105	6.4 6.4	6.2 6.0	6.2 6.2	6.2 6.1	15°	97.2	Declining rate run.
174 CMM	9-5	0.28	D	SAME AS RUN #174MM	Ave. = 0.73 Max. = 1.1	Ave. = 6.7 Max. = 10.0	SAME	AS RUN	#174MM				18	18	7236	9247	SAME	AS RUN	#174MM		15°	97.2	Declining rate run.
174 CC	9-5	0.28	D	SAME AS RUN #174MM	Ave. = 0.73 Max. = 1.1	Ave. = 6.7 Max. = 10.0	SAME	AS RUN	#174MM				19	19	7638	9268	SAME	AS RUN	#174MM		15°	97.4	Declining rate run.
175	9-19	0.45	D	SAME AS RUN #174MM	16.7	4.2	SAME	AS RUN	#174MM				11	11	2772	5193	6.7 6.7	6.2 6.2	6.2 6.2	6.4 6.3	15°	92.3	
175 MM	9-19	0.45	D	SAME AS RUN #174MM	Ave. = 0.56 Max. = 0.66	Ave. = 5.1 Max. = 6.0	SAME	AS RUN	#174MM				18	18	5508	6975	SAME	AS RUN	#175			96.4	
175 CMM	9-19	0.45	D	SAME AS RUN #174MM	Ave. = 0.57 Max. = 0.66	Ave. = 5.2 Max. = 6.0	SAME	AS RUN	#174MM				18	18	5616	7117	SAME	AS RUN	#175			96.4	
175 CC	9-19	0.45	D	SAME AS RUN #174MM	Ave. = 0.59 Max. = 0.66	Ave. = 5.4 Max. = 6.0	SAME	AS RUN	#174MM				18	18	5832	7401	SAME	AS RUN	#175			96.6	

APPENDIX C-2

DIAGRAMS OF FLOW SCHEMATICS TESTED DURING THE PILOT STUDY

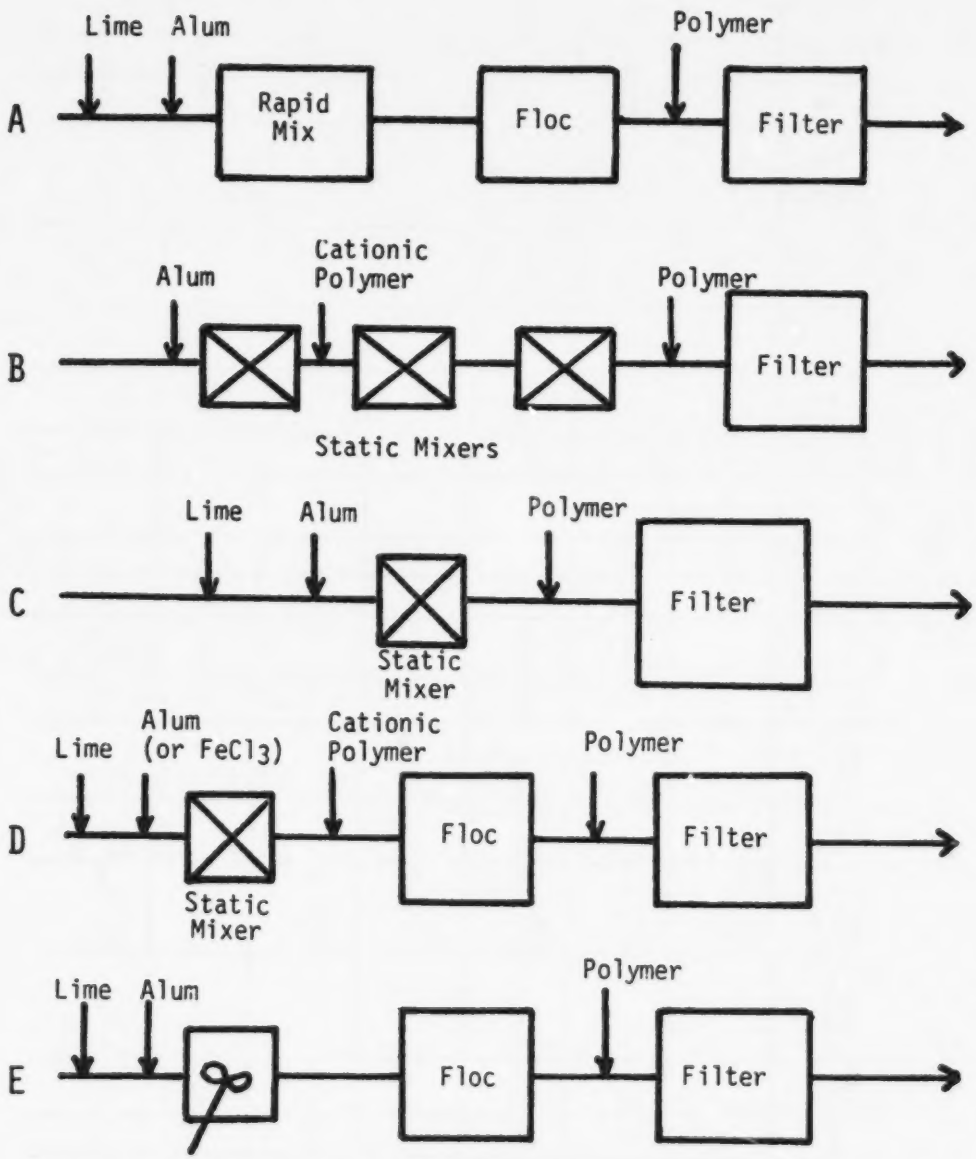


Figure C-1. Listing of flow schematics tested during pilot study.

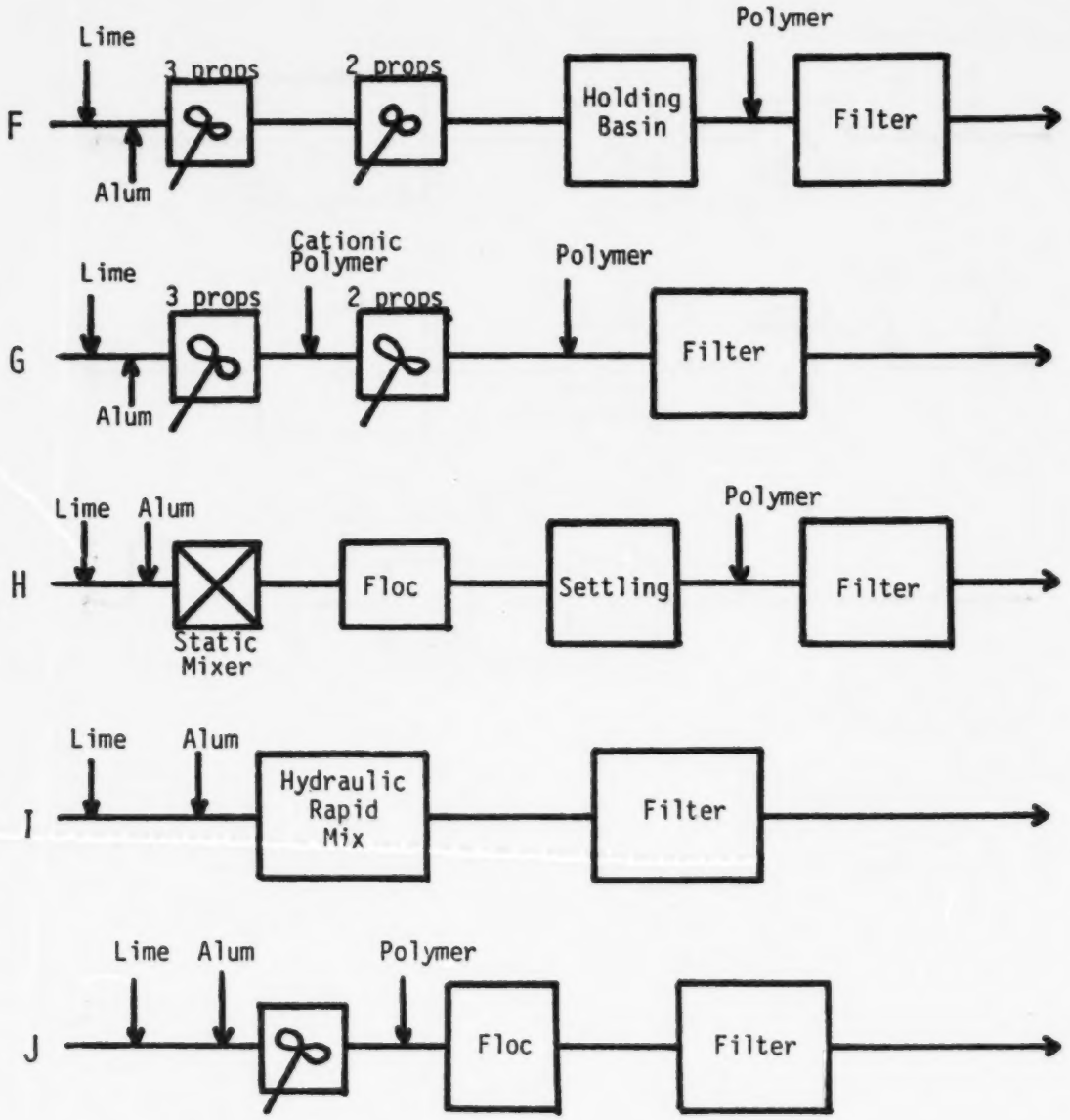


Figure C-1. Listing of flow schematics tested during pilot study.

(continued)

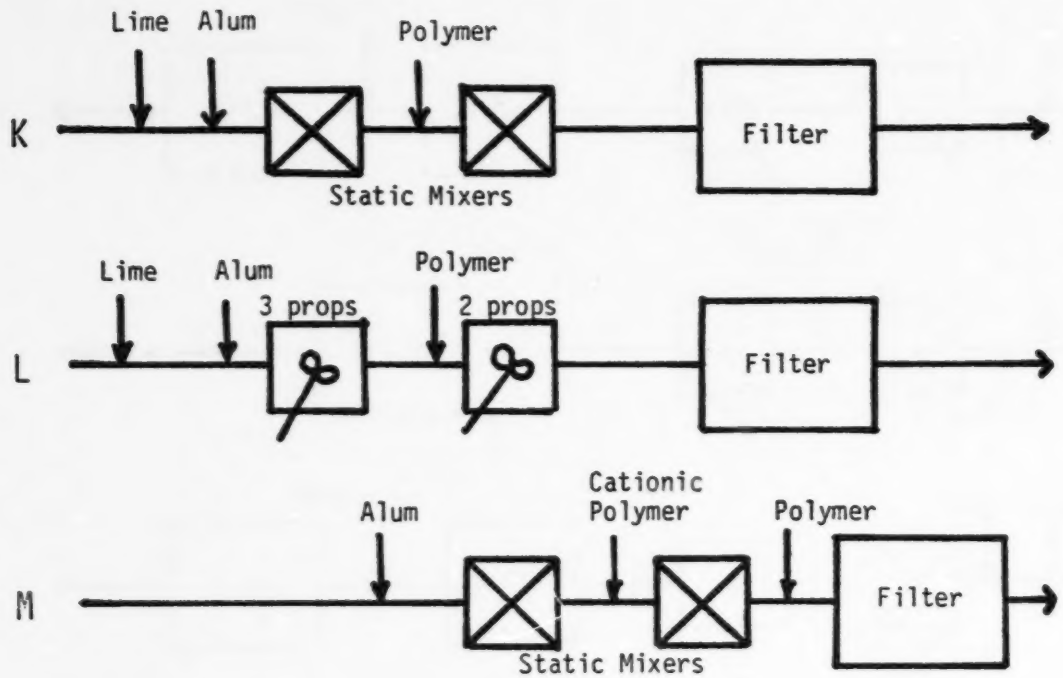


Figure C-1. Listing of flow schematics tested during pilot study.

(continued)